

**US Army Corps  
of Engineers  
Huntsville Center**

---

# **A History of Huntsville Division**

**U.S. Army  
Corps of Engineers**

**1988-1992**



Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>1996</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-1996 to 00-00-1996</b>	
4. TITLE AND SUBTITLE <b>A History of the Huntsville Division U.S. Army Corps of Engineers 1988-1992 Updat</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Army Corps of Engineers,Huntsville Division,PO Box 1600,Huntsville,AL,35807</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>93</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



**A HISTORY OF  
THE HUNTSVILLE DIVISION  
U.S. ARMY CORPS OF ENGINEERS  
1988-1992 UPDATE**



**Edited by  
Damon Manders**

**1996**

## FOREWORD

To members and friends of the Huntsville Division:

This is a story of the dedication and achievements of the men and women of a unique public service engineering organization, the Huntsville Division of the U.S. Army Corps of Engineers. History is not made in a vacuum; Division personnel worked with countless professionals in and out of government to get the job done. Many have contributed to the making of this proud history—other members of the Corps and Army, the Department of Defense, government agencies, and our many contractors. Division missions frequently took us into technical and organizational unexplored territory and made us “create” the future as we raced forward with new and sometimes vaguely defined work. But most were too busy to realize that they were actually making history, contributing individually to a great story of public service.

I hope you will pause for a few moments, or perhaps a few hours, to read this story and to acknowledge the part you played.

**Robert E. Dimichele,**

**Public Affairs Officer and Command Historian**

## **PREFACE**

Huntsville Division does extraordinarily interesting things, and the purpose of this volume is to explain its missions and functions from 1988 through 1992. The picture presented is not complete; obviously, the Division's classified missions cannot be included in an unclassified publication.

The number, diversity, and complexity of the Huntsville Division's missions have increased so greatly that organizing material to present a lucid and readable, even if superficial, overview posed problems. Because of the nature of many missions, discussion of the activities of each directorate would cause unacceptable repetition. Many of Huntsville Division's missions were acquired because of prior experience and success with related missions; therefore, grouping programs and projects in more or less loosely related categories seemed to be the most effective way to tell the story.

All documents used in preparation of the final draft are on file in the Public Affairs Office of Huntsville Division.

## **EDITOR'S INTRODUCTION AND ACKNOWLEDGMENTS**

As a native of Huntsville, it was an honor when I was given the opportunity to contribute to the history of an organization which has had such an important role, both locally and nationally. Huntsville Division's story is only becoming more significant as time passes. I only hope that the changes I made have clarified the organization and contributions of Huntsville Division.

I would like to thank all of the people who made the last six months possible; especially to the personnel in the Public Affairs Office: Bob Dimichele, Al Sweeney, Judy Wilson, and Sandy Oliver. They have provided continual encouragement and help. I would also like to extend appreciation to the many Corps personnel who have taken time to explain their work to me. Finally, I would like to thank Dr. Johanna Shields for her guidance and for the chance to work on this project.

**Damon Manders**

**9/6/96**



TABLE OF CONTENTS

FOREWORD ..... ii

PREFACE ..... iii

EDITOR’S INTRODUCTION AND ACKNOWLEDGMENTS ..... iv

TABLE OF CONTENTS ..... v

LIST OF ILLUSTRATIONS ..... vi

I. INTRODUCTION ..... 1

II. ORGANIZATION ..... 1

III. SUPPORT OFFICES ..... 7

IV. SPACE AND MISSILE TECHNOLOGY ..... 12

V. PROCUREMENT MISSIONS ..... 17

VI. DEFENSE ENVIRONMENTAL RESTORATION PROGRAM ..... 19

VII. CHEMICAL DEMILITARIZATION ..... 24

VIII. ENERGY AND FUEL ..... 30

IX. EFFICIENCY, MODERNIZATION, STANDARDIZATION ..... 33

X. OTHER PROGRAMS, PROJECTS, AND ACTIVITIES ..... 39

XI. EDUCATION ..... 45

XII. SIGNIFICANT EVENTS ..... 50

XIII. “WE DID GOOD” ..... 56

APPENDIX 1: ER 10-1-22..... 59

APPENDIX 2: COMMANDERS, 1988-1992 ..... 61

APPENDIX 3: DISTINGUISHED CIVILIAN EMPLOYEES, 1988-1992 ..... 63

APPENDIX 4: HUNTSVILLE DIVISION MANPOWER ..... 64

NOTES ..... 65

BIBLIOGRAPHY OF SOURCES CITED ..... 82

LIST OF ABBREVIATIONS AND ACRONYMS ..... 85

## LIST OF ILLUSTRATIONS

Figure 1. Military Construction: Division/District Boundaries .....	2
Figure 2. Huntsville Division Technical Expertise (Specialities) .....	3
Figure 3. Huntsville Division's Organizational Chart, 1990 .....	4
Figure 4. Huntsville Division's Organizational Chart, 1992 .....	5
Figure 5. Col. Charles T. Myers, III, commander July 1987-April 1990 .....	6
Figure 6. Col. Phillip L. Hall, commander April 1990-June 1992 .....	6
Figure 7. Col. Leo Norton, commander June-July 1992 .....	7
Figure 8. Col. Robert D. Brown, III, commander July 1992-June 1995 .....	7
Figure 9. Huntsville Division Workforce, 1992 .....	11
Figure 10. SAFEGUARD's Perimeter Acquisition Radar, 1972 .....	13
Figure 11. Meck Island .....	14
Figure 12. An artist's rendition of a Ground Based Radar at a Kwajelin facility .....	15
Figure 13. An ordnance site at Blackhills Army Depot in south Dakota .....	20
Figure 14. CSDP/Stockpile Distribution .....	25
Figure 15. The TOCDF facility under construction .....	28
Figure 16. The JACADS facility .....	29
Figure 17. An EMCS console .....	31
Figure 18. Corps of Engineers Support to MPBSP, 1992 .....	34
Figure 19. A 1391 Processor .....	37
Figure 20. An artist's rendition of MAGLEV .....	40
Figure 21. FEMA's Key Worker Blast Shelter, 16-Man .....	44
Figure 22. FY 92 PROSPECT Training (Projected) .....	47
Figure 23. The Bevill Center .....	49
Figure 24. Tornado debris in Huntsville, 1989 .....	52
Figure 25. The courtyard break area .....	55
Figure 26. 25-year anniversary coin design .....	57



## I. INTRODUCTION

The purpose of the historical program maintained by all Field Operating Activities (FOA) is to provide an accurate and analytical record of events in which the U.S. Army Corps of Engineers has participated. Objectives are to support activities of the Corps and to heighten public awareness of the significant contributions of the Corps throughout American history. Consequently, each FOA is required to publish a basic history of the organization and subsequent five-year updates.<sup>1</sup>

In response to this requirement, Huntsville Division of the U.S. Army Corps of Engineers has published a basic history by James Kitchens tracing the history of the Division from its establishment in 1967 to 1976, and two five-year updates, one by Louise Heidish covering 1977-1981 and one by Louis Torres covering 1982-1987.<sup>2</sup> This one-volume continuation deals with activities and organizational changes from 1988 to 1992.

Throughout its history, Huntsville Division has been unique. Unlike the Corps' other divisions, Huntsville has not had and does not have either geographical boundaries or districts. It has no civil works responsibilities such as flood relief. Founded in 1967 to serve a single mission, management of the design and construction of facilities needed for the Army's SENTINEL/SAFE-GUARD Ballistic Missile Defense (BMD) System, Huntsville Division has acquired programs and projects of incredible number, complexity, and diversity. The proliferation of missions began because work on the BMD program provided procurement experience on a very large scale. Eventually procurement led to other missions involving environmental restoration, chemical demilitarization, energy and fuel, efficiency, modernization, standardization, and education. One thing connects the present multitude of missions: virtually all of them require advanced engineering technology.

The nature of the changing missions, however, necessitated changes in the organization of the Division. Beginning in 1989, the Department of Defense went through a process of reorganization and down-sizing. This reorganization affected Huntsville Division in two

ways. First, the Division followed the rest of the Army in reorganizing its own offices and programs. Second, base closings actually meant more work for Huntsville Division, most noticeably in ordnance, explosive waste, and chemical "clean-up" operations, but also in modernization and standardization of facilities. Huntsville's designation in several of these areas as Design Center, Technical Center of Expertise, and Mandatory Center of Expertise inevitably meant a larger work-load. This, combined with reductions in personnel, created problems which greatly challenged the Division.<sup>3</sup> These two advancements—reorganization and the resulting increase in work—were the main themes of Huntsville Division's history from 1988-1992.

Given the shortages of funds and manpower that resulted from reorganization and realignment, the efforts of Huntsville Division personnel are to be lauded. Throughout the uncertainties of reorganization and the increasingly heavier workload, members of the Division proceeded with high levels of success in both support functions and training. These achievements were due primarily to the technical expertise and the personal standards of excellence within the Division.

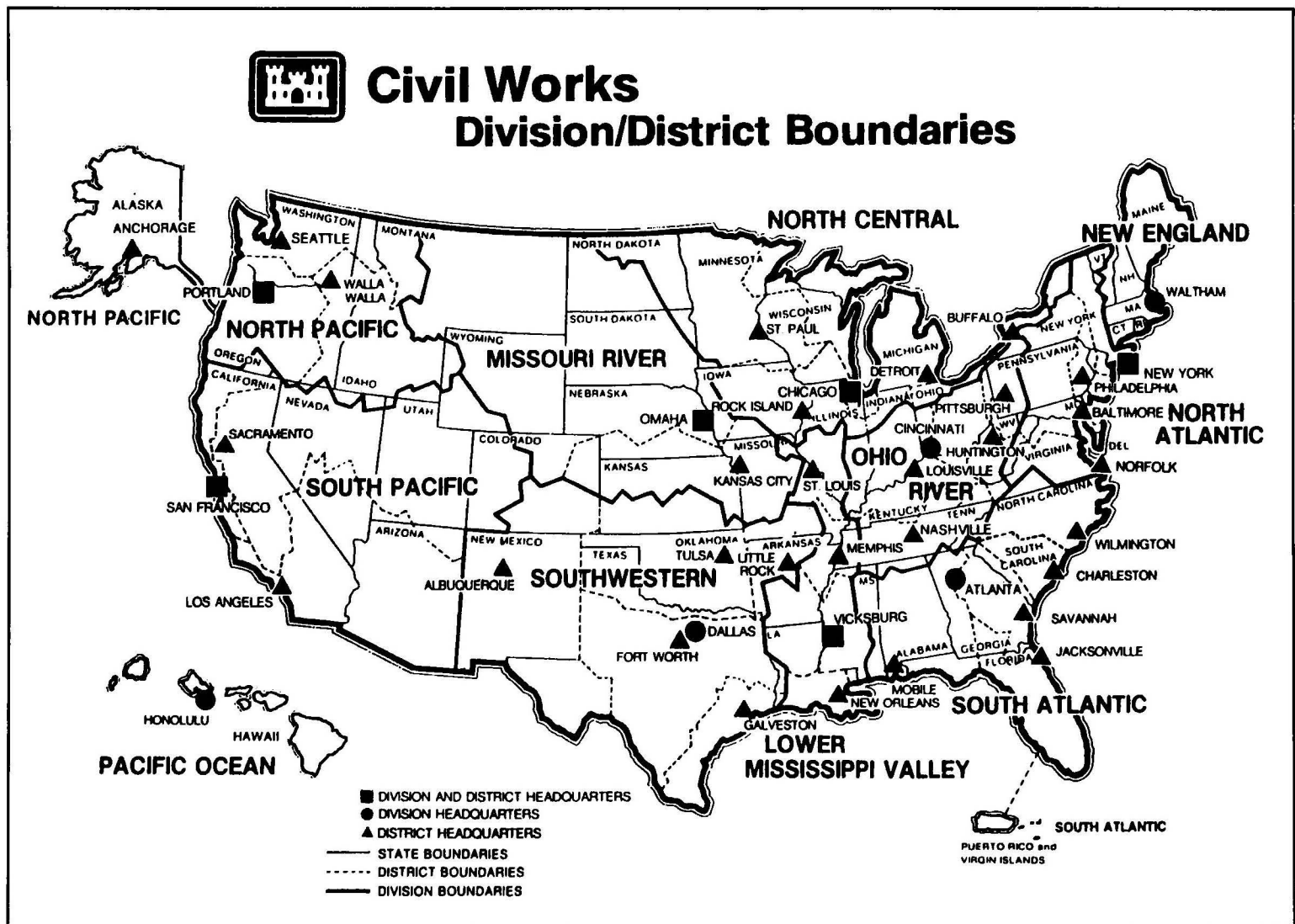
## II. ORGANIZATION

In 1989, nearly a year before the passage of the Base Closure and Realignment (BRAC) Act, the U.S. Army Corps of Engineers began a large scale realignment process to adjust Corps structures to modern missions and goals. Although Huntsville Division was not included in this process, it naturally followed suit with changes of its own. Among the changes the Division made were the expansion of its role as a center of expertise, the adoption of Life Cycle Project Management (LCPM), the reorganization of the Executive Office and the Advisory and Administrative Staff, the establishment of the Strategic Planning and Initiatives Office (SI), downsizing, transfers and promotions, and a search for new facilities to house the Division. These changes resulted in significant alterations in the way the Division functioned.



For several years, the Corps of Engineers had recognized the need to reorganize because of changes in its mission and in the United States economy. The Bayley Phase I Report, the findings of initial investigations into reorganization, was presented to Congress in 1991. By 1992, the Corps had developed and approved a reorganization plan with close Congressional coordination.<sup>1</sup> This plan would establish five geographical divisions within the continental United States, each division including from four to twelve districts; each division would have one Administrative Center and from two to four Technical Centers (see Figure 1). Huntsville Division, because it does not have geographical boundaries and because of its several areas of special expertise and mission assignments, was not included in this plan.<sup>2</sup> Instead, Huntsville Division initiated an internal realignment, although, it certainly expected to be affected by the reorganization of the Corps.

One way that the reorganization of the Corps affected Huntsville Division was through the validation and clarification of Centers of Expertise. A Center of Expertise is an organization which has demonstrated a technical capacity in a specialized area through the optimal use of talent and resources to enhance the capabilities of the Corps. Designation as a Center of Expertise implies superior technical ability and carries with it additional responsibilities for providing services. There are two types of Centers. Mandatory Centers of Expertise (MCX) are required by regulation to render services in a specialized area on a mandatory basis—Corps customers must get this specialized service from them. Technical Centers of Expertise (TCX) render advisory services which are not mandatory. Huntsville Division became recognized as a Technical or Mandatory Center of Expertise in several fields (see Figure 2). The main effect this had on the Division was increased work in these areas.<sup>3</sup>



**Figure 1. Military Construction: District/Division Boundaries.**





**US Army Corps  
of Engineers**  
Huntsville Division

## **HUNTSVILLE DIVISION**

### **TECHNICAL EXPERTISE (SPECIALTIES)**

<b>CATEGORY</b>	<b>MECHANISM</b>	<b>CUSTOMER RANGE</b>
<b>UTILITY MONITORING AND CONTROL SYSTEMS (UMCS)</b>	<b>MCX</b>	<b>DOD</b>
<b>INTRUSION DETECTION SYSTEMS (IDS)</b>	<b>MCX</b>	<b>DOD+</b>
<b>ARMY RANGE AND TRAINING LAND PROGRAM (RTLP)</b>	<b>MCX</b>	<b>DA AND MARINE CORPS+</b>
<b>ORDNANCE AND EXPLOSIVE WASTE (OEW)</b>	<b>MCX</b>	<b>DOD+</b>
<b>EXPLOSIVE SAFETY &amp; BLAST DESIGN</b>	<b>TCX</b>	<b>DOD+</b>
<b>OPERATION &amp; MAINTENANCE ENGINEERING ENHANCEMENTS (OMEE)</b>	<b>TCX</b>	<b>DOD</b>
<b>DEMAND SIDE MANAGEMENT (DSM)</b>	<b>TCX</b>	<b>DA</b>
<b>THIRD PARTY CONTRACTING (TPC)</b>	<b>TCX</b>	<b>DOD</b>
<b>SHARED ENERGY SAVINGS (SES)</b>	<b>TCX</b>	<b>DOD</b>
<b>EMP SHIELDING</b>	<b>TCX</b>	<b>DOD</b>

**Figure 2.** Huntsville Division's Technical Expertise (Specialties).

Another major change that affected the Division came with Life Cycle Project Management (LCPM), instituted by the Corps in July 1988. In this program, a Project Manager, either an individual or a team of individuals from appropriate directorates or branches, was responsible for a project throughout its life with the Corps—from the planning stage, through production, to operation. Project Managers focused on the entire project and were responsible for schedules and budgets. The Corps developed a policy of allowing Project Managers to “shop” among Technical Centers, providing an opportunity to seek assistance for mission assignments. Huntsville Division had a history of emphasizing customer satisfaction, so it had been using similar concepts and techniques before it formally adopted the LCPM system in 1992. For the Division, the major change under the LCPM process was a new reporting system through a Project Review Board at the division level which often seemed cumbersome at Huntsville Division because of the unusual nature of the specialized work it performed.<sup>4</sup>

In preparation to adopting LCPM, Huntsville Division began planning the realignment of its offices in February 1990. With the new arrangements, the Division Headquarters Executive Office was assisted by an Advisory and Administrative Staff, Special Assistants, and Boards, Committees, and Teams. Mission Staffs were grouped into two Technical Staffs: Programs and Project Management, and Chemical Demilitarization and Special Projects. The reorganized Executive Office consisted of the Commander, the Deputy Commander of Chemical Demilitarization Programs and Special Projects, and the Deputy Commander of Programs and Technical Management. The Executive Assistant position was converted into the position of Administrative Officer. Advisory and Administrative Staff included Directorates of Resource Management, Information Management, Human Resources, CE Training Management, and Logistics Management, the Office of Counsel, Audit Office, Public Affairs Office, Safety and Occupational Health Office, Office of Security and Law En-



forcement, the Assistant Division Commander, the Special Assistants, and Boards, Committees, and Teams. The Programs and Technical Management Staff included the Strategic Planning and Initiatives Office and the Directorates of Engineering, Contracting, and Programs and Project Management (see Figures 3 and 4).<sup>5</sup>

Reorganization included the establishment in 1991 of the Strategic Planning and Initiatives Office (SI), which was a one-person office with the primary function of seeking new missions for Huntsville Division. Someone was selected annually by the Deputy Commander of Programs and Technical Management to fill the position of Chief of SI as a developmental assignment. The first chief was Leo Carden, then Chief of Project Management, and the second was Sam Bolin, Chief of Project Management's Criteria and Special Projects Division. SI reported directly to the Deputy

Commander for Programs and Technical Management and was Huntsville Division's point of contact for strategic planning, new missions, and major revisions of current projects. Being strictly advisory, with no power to decide or implement anything, SI was concerned with initial planning and advising the commander and senior staff. It worked through the Management Coordinating Group.

Strategic Planning was the formalized planning process used to achieve long-range goals. Responsibilities of the SI office were defined more clearly in 1992. The office was to: (1) determine Huntsville Division's role in large, complex programs; (2) bring new missions to Huntsville; (3) provide long-range mission planning; and (4) market Huntsville. By the end of 1992 it had been concerned with ten significant new work assignments; five more were under consideration; six other initiatives

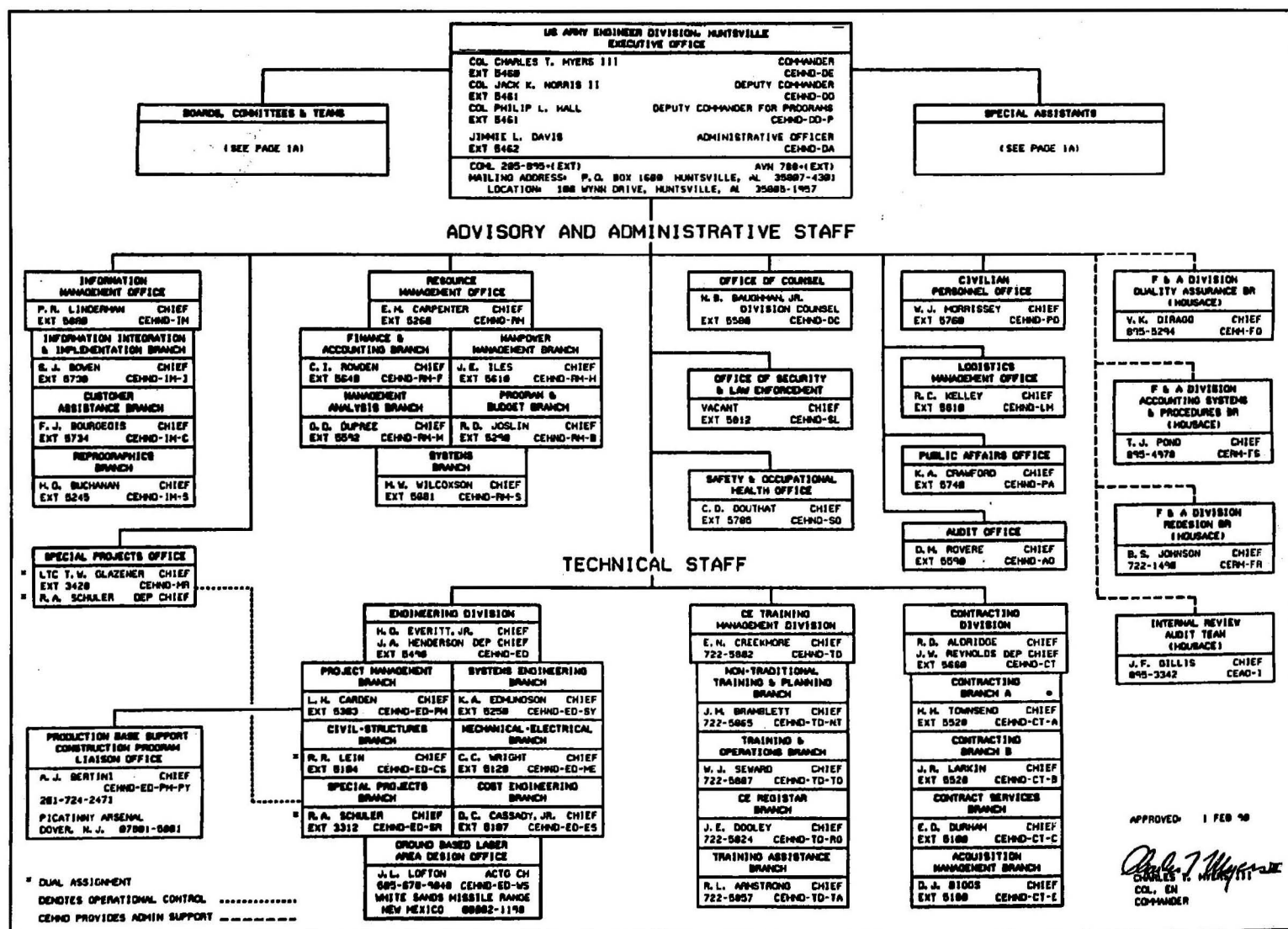


Figure 3. Huntsville Division's Organizational Chart, 1990.



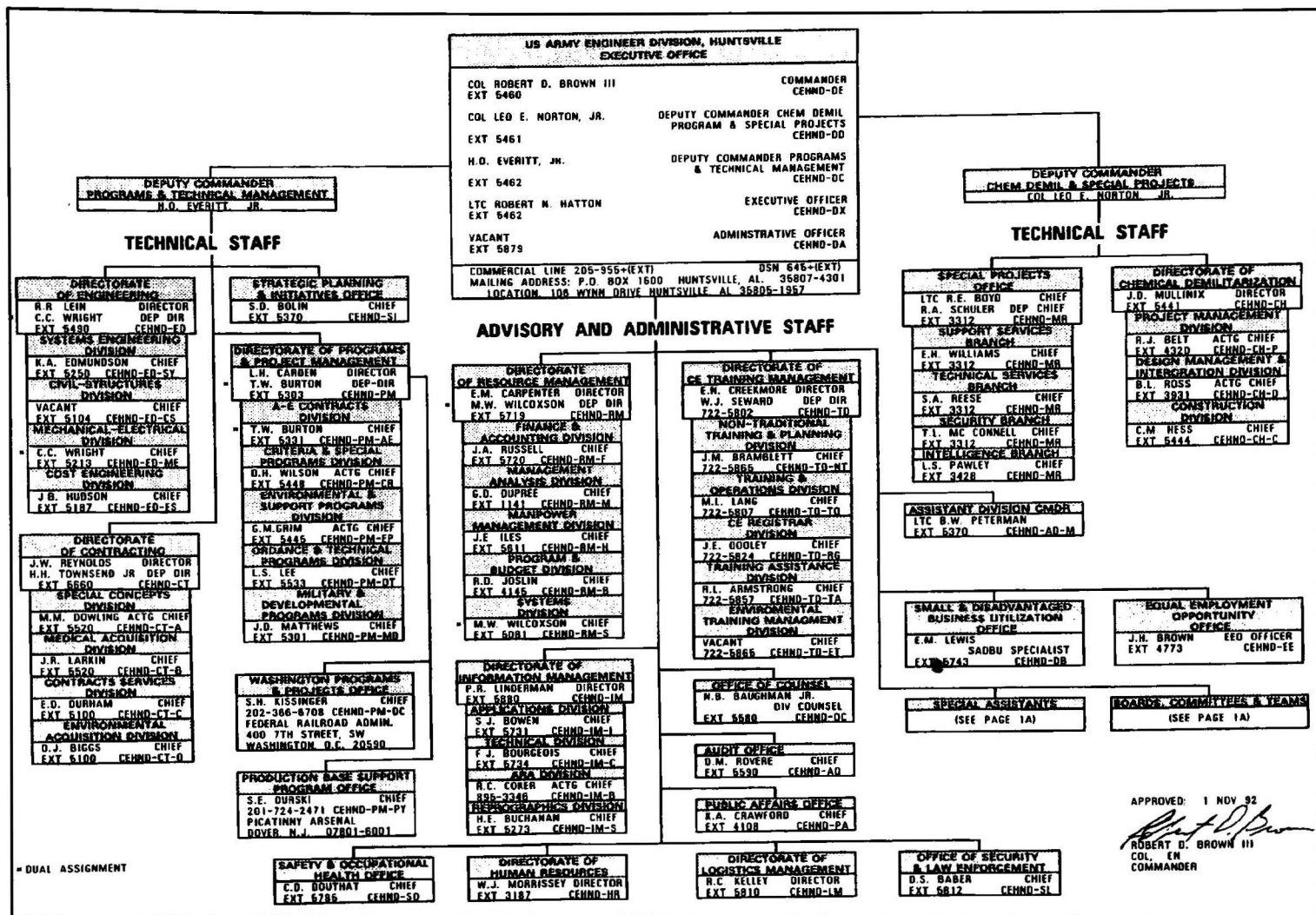


Figure 4. Huntsville Division's Organizational Chart, 1992.

did not materialize. One of the most notable projects was Huntsville's function as a Technical Center of Expertise (TCX) for Seismic Support for the Corps of Engineers North Pacific Division in Portland. A TCX performs planning, design, and review of projects in their specialized field, and Huntsville's scope of work as TCX was to perform field investigations and seismic assessment, develop criteria, apply risk assessment, develop remedial designs, program projects, and perform remedial work. In performing its functions, SI used both direct and indirect marketing techniques. By early in 1993 it recognized trends that would affect Huntsville and the Corps in general: major growth areas would continue to be environmental work and energy conservation; major problems involved money, including declining Department of Defense budgets, manpower reductions, and customers shopping for services based on cost.<sup>6</sup>

Structure was not the only aspect of Huntsville Divi-

sion affected by reorganization. As late as September 1989 the Executive Office was talking about recruiting from colleges, intending to bring recent graduates into the Division on a continual basis. Less than six months later, however, it was obvious that the Department of Defense's civilian hiring freeze imposed on 11 January 1990 would curtail such plans. Although there would be some exceptions to the hiring freeze, the Department of Defense hoped that this policy combined with routine attrition would result in a decrease of 100,000 civilian jobs by 1995 without necessitating layoffs. There was talk of flexibility, stressing quality over quantity, and upgrading equipment, training, and pay.<sup>7</sup> By the end of 1991, dramatic changes had occurred. The Department of Defense had "reduced its work force by 88,000 civilians while the number of persons in GS/GM grades 13 through 15 increased by 5,000." The result was a cap on high-grade civilian promotions in both the



Army and the Navy. At Huntsville this policy had the greatest effect on Chemical Demilitarization and environmental programs.<sup>8</sup>

Less spectacular changes occurred with routine transfers and promotions of individuals. Colonel Charles T. Myers III, Division Commander since 15 July 1987, was succeeded by Colonel Philip L. Hall at a Change of Command ceremony 20 April 1990. During an interim period Lieutenant Colonel Jack K. Norris served as Chief of Staff and Deputy Commander; on 1 March 1989 Norris was promoted to the rank of colonel.<sup>9</sup> In the summer of 1990 Colonel Leo Norton arrived as Deputy Division Engineer with responsibility for the Chemical Stockpile Demilitarization Program (CSDP) and Special Projects. After Colonel Hall retired, Colonel Norton served briefly as division commander until the assumption of command by Colonel Robert D. Brown III on 28 July 1992. (See the commander profiles in Appendix 3).<sup>10</sup>



**Figure 5.** Col. Charles T. Myers, III, Commander, July 1987-April 1990.



**Figure 6.** Col. Phillip L. Hall, Commander, April 1990-June 1992.

The Executive Assistant's position was a key one in Huntsville Division. Jimmie Davis, a federal employee for twenty-two years, was the Division's first civilian employee in 1967; in 1978 she was promoted to Huntsville Division's Executive Assistant. Colonel Myers awarded her the Meritorious Medal for Civilian Service in 1988. When she retired on 1 November 1991, she was replaced by Toni Hamley, who had begun her federal career in 1971. With the arrival of Lieutenant Colonel Robert N. Hatton in the summer of 1992, the Executive Assistant position was converted into an Administrative Officer position and Hamley moved to the Strategic Initiatives Office.<sup>11</sup>

Other developments involved the physical facilities for Huntsville Division. By 1992 it was apparent that the Division needed to find a new building; it simply had outgrown its home, and its offices were scattered around Huntsville. In February Lieutenant Colonel Eugene (Hal) Cranor, Executive Officer, named three employees to a DUMP committee (Division's Urgent Moving Project), the aim of which was to find a new location. Employees expected the move to take place





**Figure 7.** Col. Leo E. Norton, JR., Commander, June-July 1992.



**Figure 8.** Col. Robert D. Brown, III, Commander, July 1992-June 1995.

not later than 1 July 1993, but the site had not even been selected by that date.<sup>12</sup>

With the clarification of centers of expertise, the adoption of LCPM, the restructuring of executive offices and staff, the establishment of SI, and the transfers and promotions, one might expect lengthy periods of adjustment. However, the evolution of Huntsville Division's organization and the extraordinary capabilities of its personnel, both military and civilian, enabled it to continue making great contributions to the welfare of the United States. The Division met challenges with skill, speed, and ultimate success.

### III SUPPORT OFFICES

The increasing number and variety of Huntsville Division's activities caused changes and growth in the support offices. None of the significant activities in which Huntsville Division became engaged could have occurred without the flexibility and evolution of the staff. Support offices at Huntsville Division can be divided into two categories. First are the many separate directorates and offices that operated on a relatively independent level, including the Directorate of Resources Management, Directorate of Information Management, Directorate of Human Resources, Directorate of Logistics Management, the Office of Counsel, the Audit Office, the Public Affairs Office, and the Safety and Occupational Health Office. Another set of offices consisting of the Office of Security and Law, the Value Engineering Office, the Small and Disadvantaged Business Office, and the Equal Opportunity Office also held an advisory position aside from other duties. In a time of reorganization and rapid change, the activities of these organizations were far from routine. For all these directorates and offices, the theme running through the years from 1988 through 1992 was increased automation.<sup>1</sup>

The office that was most involved in automation was the Directorate of Information Management (IM), whose main function was to manage, integrate, and implement information technology through records management,



information reproduction, computer acquisition, and directing computer operations. It was, for example, responsible for distributing facsimile machines among Division offices. Much of IM's work included developing automated computer systems. Huntsville Division became the Assigned Responsible Agency for more than two dozen automated application systems, including the Programming, Administration and Execution (PAX) systems residing on a mainframe computer in St. Louis, Missouri. The increasing work load that resulted from these responsibilities necessitated the reorganization of IM from three divisions to four—an Assigned Responsible Agency Division originated during this period to effectively manage the administration of PAX and other automated systems for which it was now responsible.<sup>2</sup>

Huntsville Division's Directorate of Human Resources (HR), whose major areas of concern were recruitment and employee relations, also made some changes in operation during this period. Standardization and automation were combined when HR implemented the Army Civilian Personnel Data System (ACPERS) and the new Civilian Intelligence Personnel Management System (CIPMS) in 1990. ACPERS was a uniform, Army-wide personnel system intended to speed information responses for personnel management. CIPMS, for which the Division became the center of expertise for the Corps of Engineers, was a modernized civilian personnel management system comparable with that used in intelligence agencies like the CIA. Both automated systems were intended to promote standardization, and therefore efficiency, within the Department of Defense.<sup>3</sup> In spite of various hiring restrictions, recruitment and placement functions continued, and the number of employees at Huntsville Division actually increased (see Appendix 4). Uncertainty and anxiety had an adverse effect on morale, however, and counseling services provided by the Management-Employee Relations staff increased conspicuously.<sup>4</sup>

The Directorate of Resource Management (RM) worked closely with IM and HR, as required by RM's mission of maintaining the economy and efficiency of Division operations. Most of this work involved accounting and financing or managing Division manpower, but RM also coordinated several programs, including

the implementation of the Life Cycle Project Management Program in 1991. The Directorate also supported the Army Ideas for Excellence Program (AIEP), an employee suggestion program, by helping to create articles, posters, and videos that promoted employee contribution. Plus, RM was deeply involved in planning and scheduling Huntsville Division's move into its new facility, which was to take place after 1992.<sup>5</sup>

The Directorate of Logistics Management (LM) was an organization that specialized in helping other offices perform their functions. LM was primarily concerned with facility maintenance and the moving and location of both personnel and materials. For example, it was responsible for storage, packing, inventory, and distribution of all course materials for the Training Management Directorate. Not surprisingly, LM also became involved with plans for transferring Huntsville Division to its new facility. A major improvement during these years was the centralization of warehouse facilities within a mile of the Division. In addition to increased efficiency due to reduced travel time, the new facilities were climate-controlled, thus reducing weather damage to stored materials.<sup>6</sup>

Although the Office of Counsel preferred to keep a low profile, it was actually a very busy place. Routine business included solicitations, reviewing and modifying contracts, reviewing letters, giving advice, and occasional litigation. There were very few legal problems at Huntsville Division regarding personnel matters. Most legal disputes were about contracts, and as activities involving environmental restoration and the destruction of chemical weapon stockpiles increased, the Office of Counsel became more heavily involved in all legal aspects of those activities. This office had only one professional vacancy from 1988 to 1992, and a female was selected for the position.<sup>7</sup>

The Audit Office, which consisted of three full-time auditors, served as staff advisor to the Division Engineer and members of his staff by performing audits and internal reviews; providing liaison, monitoring, and audit follow-up service on audits and inquiries from external agencies; and troubleshooting areas where independent assessments of problems were necessary. The most interesting and significant reviews during this period were of the Value Engineering Program at Huntsville



Division and of the procurement of furniture and medical equipment (specifically, liquid oxygen and Magnetic Resonance Imaging equipment) for the Surgeon General. These services helped identify problem areas that were costing the Division time and money, and eventually led to the reorganization of the Value Engineering Office.<sup>8</sup>

The function of the Public Affairs Office (PAO) was to provide information about the people, missions, organization, and leadership of Huntsville Division to personnel in the Division itself, the Corps of Engineers, the Department of the Army, and the public. The methods could be divided into four categories: Command Information, Public Information, Community Relations, and historical activities. An important part of the Command Information process was publication of the Division's monthly newspaper, the Information Bulletin, which was renamed the Huntsville Bulletin in 1989. This journal was not only a source of current information but also would become a historical source. Likewise, still photography services at various events provided current information as well as documentation for future use. Other Command Information activities included working with the Personnel Office to develop a better New Employee Orientation and with other branches to improve Fact Sheets and briefings, and supporting the development of the Army Communities of Excellence Program (ACOE), an Army wide effort to improve the atmosphere of military workplaces, residences, and training facilities. For its Public Information responsibilities, PAO provided media training classes for the Division employees, provided news clips to the Division Engineer and his staff, responded to media and individual queries, often in a near-crisis atmosphere, and targeted specific publications for Public Information release and opportunities. In order to promote better community relations, PAO produced brochures and developed visitor's packets, supported various exhibitions and organizations, and organized and publicized a Speaker's Bureau. By 1990 the PAO historical activities had expanded beyond publishing five-year historical updates. PAO published the five-year historical update in late 1990, but an annual historical update program also began that year to gather and publish historical information on a yearly basis. At the same time, PAO established an oral/video history program, too.<sup>9</sup>

The activities of the Public Affairs Office continued to increase in 1991 and 1992, especially because of its growing involvement with the removal and destruction of unexplored munitions under the Defense Environmental Restoration Program and the Chemical Demilitarization Program, which both aroused intense media, legislative, and public interest. This increase in work necessitated an increase in personnel. In 1991 the PAO established, organized, and held the Division's first Retirees Open House, which became an annual event. The office made more and better use of bulletin boards to attract attention and provide information, and it participated in career days and other special events in support of various programs. The office also facilitated meetings between the commander and public officials and their staffs.<sup>10</sup>

In 1992 the PAO maintained liaison with the offices of Alabama senators and local congressmen. Previously initiated activities increased in scope and intensity, media queries being a good example. Because Huntsville Division has no geographic boundaries, its personnel routinely work in many areas. With growing public interest in some programs, PAO people traveled to many of the sites, primarily to hold public meetings there. Concomitantly the office developed and taught a "Dealing With the Media and the Public" course for Division personnel. The office set up a special World War II commemoration display, and a major event was the Silver Anniversary Celebration and Retirees Open House. The Command Information Officer was detailed to the Headquarters of the Corps of Engineers for several weeks to edit material for the Environmental Office.<sup>11</sup>

A small office with a growing role was Huntsville Division's Safety and Occupational Health Office. It sought to reduce the health risks from activities as diverse as Chemical Demilitarization and computer use which might cause Carpal Tunnel Syndrome. Its largest activities were remediation projects involving Ordnance and Explosive Waste (OEW). Part of the Division's responsibilities in environmental restoration included cleaning up sites that contained munitions or explosive materials, and in 1991 the Division became the Mandatory Center of Expertise (MCX) of OEW remediation. As MCX for OEW, Huntsville Division provided guidance to all Corps offices on detection,



clean-up, and safety, the primary goal of which was to make a site as safe as possible with minimum risk to anyone.<sup>12</sup>

All of these directorates and offices operated comparatively independently, but there were several offices whose chiefs served as Special Assistants to the Executive Office. The head of the Security and Law Office, the Value Engineer, the Small and Disadvantaged Business Utilization Specialist, the Equal Employment Officer, and the managers of the Black Empowerment and Federal Women's Programs were members of the commander's advisory staff and thus worked closely with the Executive Office. In this capacity, their role has been very visible.

An important mission for any military organization is the security of its people and facilities. At Huntsville Division, the Office of Security and Law Enforcement (SL) implements security policies, practices, and procedures to protect information, employees, and property important to national security. It also acts as staff advisor and consultant to Huntsville Division regarding these matters.<sup>13</sup> In 1990 SL installed a new electronic security system in the building occupied by most Huntsville Division employees. This system included closed-circuit television, electronic card readers at all entrances for individual badges (Magnetic Strip Access Cards), and an intercom system. Supplementing the new system were guard personnel.<sup>14</sup> In spite of this new security system, theft increased and reached an all-time high in 1992. As Huntsville Division became more fully computerized, most of the larceny involved computers and computer accessories. A hot-line instituted in 1992 yielded eight cases, most of which involved improper use of government telephones and falsification of time and attendance records.<sup>15</sup>

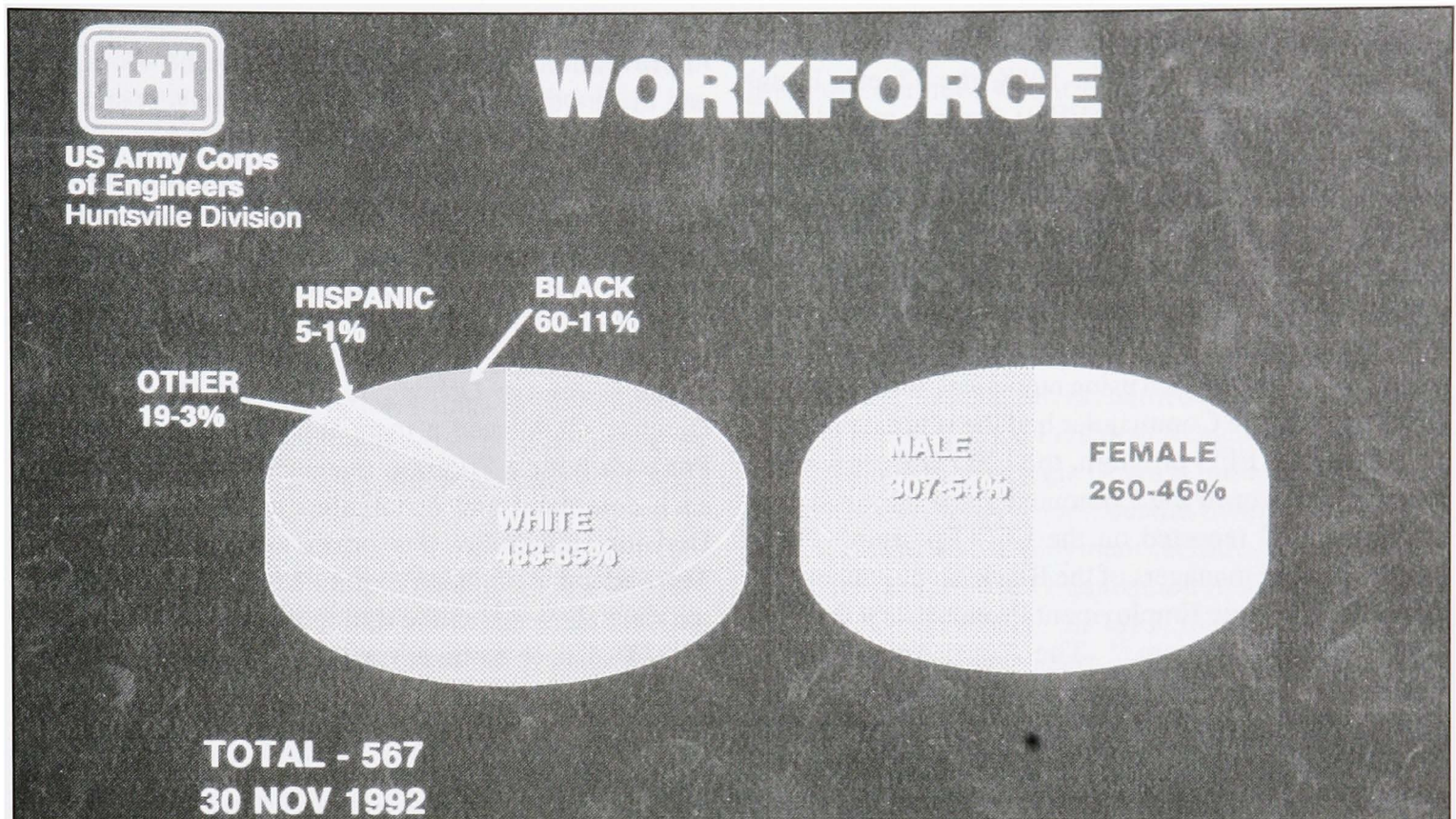
Also during this period, Huntsville Division reinstituted a full-time Value Engineering (VE) Office, which sought savings on projects through independent investigation. The first significant savings by a value engineering task force occurred in 1969. Huntsville Division had a full-time VE officer in the 1970's, but by 1988 it had become an adjunct position held by a Division employee in addition to other responsibilities. In 1988, there was also a five-person Value Engineering Action Committee to assist the Officer.<sup>16</sup> The intention

was for an outside investigator, an engineer who was not personally connected with a project, to re-examine it for cost-effectiveness at an early stage—after criteria had been established and work begun, but before time lost from redesign would be more than minimal. Studies repeatedly showed that, for every \$1 invested in Value Engineering, the return was more than \$20. Corps of Engineers policy required a Value Engineering study on all projects with an estimated construction cost of \$2 million or more.<sup>17</sup>

Since 1988, several problems in Value Engineering arose that resulted in changes in the funding and organization of the VE Office. Value Engineering study funds had come from a revolving fund, but Value Engineering studies had increased more than 300 percent since 1984, and the revolving fund was inadequate. Consequently, beginning in Fiscal Year 1989, all Value Engineering study funds would be obtained from design funds.<sup>18</sup> In 1991 the Audit Office disclosed significant problems with Huntsville Division's Value Engineering Program which had cost the Division almost \$10 million on six military construction projects. The Commander approved the Audit Office's sixteen recommendations for improving the program. On 23 August 1992 a new full-time Value Engineering Officer was appointed as a Special Assistant on the Commander's staff in an effort to increase value engineering savings.<sup>19</sup>

Another important support office was the Small and Disadvantaged Business Utilization Office, which worked with the administration and offices of Huntsville Division to promote the access of small businesses to the Division. The Small Business Office worked with very strictly categorized businesses as defined by the Small Business Administration (SBA). For their purposes, a small business was one which operated for profit but did not exceed the maximum size set for its type. There were two types: service firms, the size of which was measured by annual revenues, and manufacturers, the size of which was measured by the number of employees. A Small Disadvantaged Business (SDB) was a small business which was owned and managed by one or more members of a recognized minority group, and a Women-Owned Business was a small business owned and managed by one or more women. A Section 8 (a) business was a SDB which had been accepted for a





**Figure 9.** Huntsville Division's Workforce, 1992.

maximum of nine years in a SBA managed "start-up" program, through which the SBA provided both management and financial assistance to small businesses. "SBA enters into contracts with federal agencies and then subcontracts with the 8 (a) firms on a sole source noncompetitive basis."<sup>20</sup> The Division's Small Business Specialist, who headed the office and served as a special assistant to the executive office, spent much of his time dispensing information. Most of these presentations were oral, such as briefings and counseling, but the office also published and provided to businesses a Marketing Guide which gave information on relevant programs. An additional service of the Specialist was to serve on a committee that reviewed and rated subcontracting plans submitted to the Division. As a result of these activities, the office generally met or exceeded its goals every year between 1988 and 1992.<sup>21</sup>

One area of the Small Business Office activity, however, was a persistent disappointment. Congress had directed that contract awards to Historically Black Colleges and Universities/Minority Institutions be increased

with a goal of 3 percent of all the dollars awarded to institutions of higher education. The Department of Education, which decides what schools qualify, determined that three local institutions met the requirements: Alabama Agricultural and Mechanical University, J.F. Drake Technical School, and Oakwood College. In spite of repeated solicitations, none of these schools responded. There were several possible reasons for this lack of interest, including lack of familiarity with acquisition procedures and forms, lack of organization within the institutions to respond in a timely manner, time conflicts between contract requirements and existing staff commitments, inadequate incentives for faculty and staff who would have to do most of the preliminary work, and rapid turn-over in administrative positions, with accompanying reluctance to make long-term commitments or allocate scarce resources with no immediate gain. In spite of frustration, the office persisted in efforts to interest these schools in the program.<sup>22</sup>

The Equal Opportunity Officer also acted as a special assistant to the commander. Huntsville Division has had



a better-than-average record for Equal Employment (see Figure 12). In fact, early in 1988, the Chief's Equal Employment Opportunity (EEO) Award (including a Certificate of Recognition and a trophy) was presented to Huntsville Division in recognition of its achievements in Affirmative Action and Equal Employment Opportunity during FY 1987, especially for exceeding affirmative action goals for minorities and women in professional categories.<sup>23</sup> The Division had an aggressive affirmative action program using numerical goals and time-tables. While the Commander had the ultimate responsibility for the EEO program, the EEO Officer was the principal advisor to the Commander and administered, evaluated, and reported on the EEO Program. Other personnel were managers of the Black Employment Program, the Hispanic Employment Program, and the Federal Women's Program.<sup>24</sup> The Asian American and American Indian Employment Programs were not staffed; they were the only minority groups in the Division with representation above parity, and their combined average grade was higher than any other group at the Division.<sup>25</sup>

Detailed analysis indicated that, compared with the local civilian labor force, there was a manifest imbalance of women and minorities in four occupations: all engineering positions, computer specialists, accounting, and education and training specialists. Specific numerical hiring objectives were established, and intense recruitment was initiated for those groups. In spite of the impediment of various hiring freezes, EEO made considerable progress by the end of 1992.<sup>26</sup> Initial indications were that all minority groups and women were receiving their proportionate share of awards, promotions, training and development opportunities, and committee positions. The EEO Office had the active cooperation of the Public Affairs Office in routine reporting and in support for special heritage opportunities.<sup>27</sup>

One of the key issues that EEO tried to address was sexual harassment. Between 1988 and 1992 Huntsville Division and the Department of the Army became increasingly concerned with preventing sexual harassment in the workplace. With more attention being paid to the matter, it became clear that, while progress had been made, the problem certainly had not vanished.<sup>28</sup> As early as December 1984 Huntsville Division began training

in Prevention of Sexual Harassment in the Workplace, and there were six certified course managers and three trainers to teach the annual sessions thereafter. Initially, enthusiasm was not always great, but by 1 October 1991, 93 percent of all supervisors and managers and 563 employees had received the training.<sup>29</sup>

Along with EEO, two equal employment program managers also served on the advisory staff that reported to the Executive Office. In 1988 the Department of Defense established a mandatory Black Employment Program with a Program manager to be appointed at each command and installation level. At Huntsville Division a committee was formed to assist the manager.<sup>30</sup> The Federal Women's Program Manager and Committee were also very active during these years. They conducted surveys to discover the interests and needs of Huntsville Division's female employees, published a newsletter, and participated in a variety of programs. The support of the commander, first Colonel Charles T. Myers II and then Colonel Philip L. Hall, facilitated the program's success.<sup>31</sup>

Each of these offices was vital to the work of Huntsville Division. Some, like Information Management or the Office of Counsel, did limited work for customers outside of the Corps of Engineers, but all of them provided important support services to the Division, from keeping records and providing security, financial, legal, or logistical support, to advising the commander about business practices, affirmative action, women's issues, and security. In the long run, these activities enabled Huntsville Division to continue running smoothly as it fulfilled its mission.

## **IV SPACE AND MISSILE TECHNOLOGY**

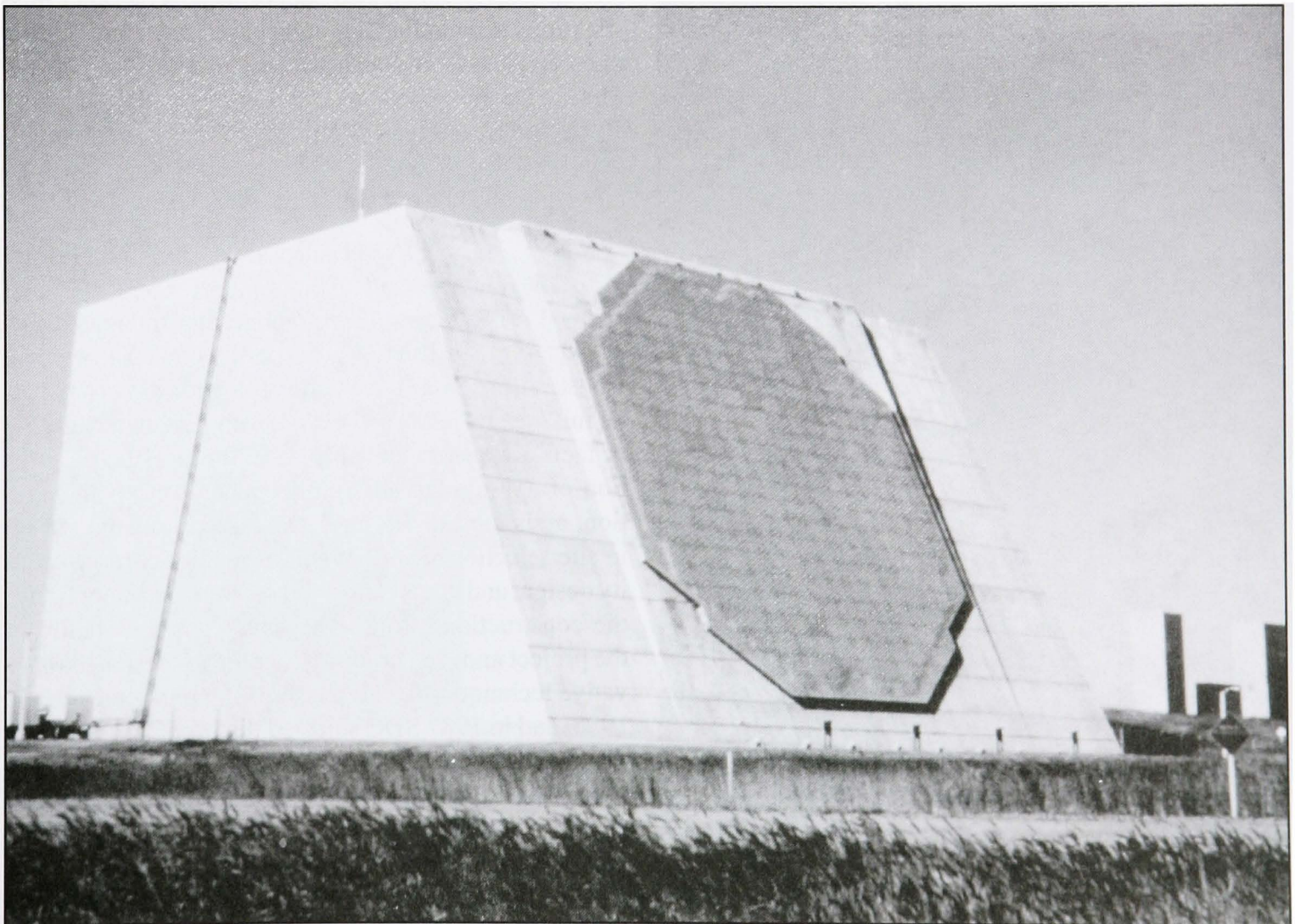
The original mission of Huntsville Division was to support a missile defense program for the U.S. Army Space and Strategic Defense Command (USASSDC).



The Division has since supported several other organizations involved with space or missile technology, including the National Aeronautics and Space Administration (NASA), the Defense Nuclear Agency (DNA), and the U.S. Army Missile Command (MICOM). Most of the services that the Division provided for these agencies consisted of design and construction oversight for both testing and deployment facilities of various missile defense systems, but the Advanced Technology Branch of Huntsville Division's Engineering Directorate also provided invaluable services concerning the research, development, testing, and evaluation of systems survivability.

Huntsville Division was founded in 1967 with a single mission, which was to manage the design and construction of facilities needed for the Army's SENTINEL/

SAFEGUARD Ballistic Missile Defense System. Congress discontinued funding for the SAFEGUARD system in 1975, but Huntsville Division remained the Corps' single Point of Contact to USASSDC in supporting the Ballistic Missile Defense System Command, the Ballistic Missile Defense Advanced Technology Center, and the Kwajalein Range Directorate. One of Huntsville Division's major activities in the 1970's and 1980's was building facilities for deployment of the Low-Altitude Air Defense System, later renamed SENTRY. Then beginning in 1983, when President Reagan announced the conception of the Strategic Defense Initiative (SDI) Program, Huntsville Division became involved in the design of testing and deployment facilities for the Strategic Defense Initiative Organization in association with USASSDC and others. In 1985, the Division became the lead Corps of Engineers division in support of SDI.



**Figure 10.** SAFEGUARD'S Perimeter Acquisition Radar, 1972.



Because of the early success of these efforts, several other agencies also sought the Division's support for space or missile projects, including NASA, DNA, and MICOM.<sup>1</sup>

Since 1967, Huntsville Division has been closely associated with USASSDC— throughout its history, through various changes of the agency's name, and through many projects. On 17 July 1987 Huntsville Division was appointed the Corps of Engineers single point of contact for USASSDC support. Thereafter, Huntsville Division's role in this association was to pro-



**Figure 11.** Meck Island.

vide support for facilities which test deployment concepts and also for actual deployment of SDI systems or related missile technologies. The emphasis was on engineering and design of facilities for testing. Most of the launch facilities were located on Pacific islands: Meck Island, U.S. Army Kwajalein Atoll in the Marshalls, Wake Island, and Hawaii. Some of the projects in this period were short lived, such as the Braduskill Interceptor Concept Launch Complex, which was halted at the concept stage, and the Kinetic Energy Antisatellite Demonstration Complex, which was canceled when it was decided that flight tests were not necessary to obtain data. Among the active projects were several missile defense systems operating in conjunction with HEDI or High Endoatmospheric Defense Interceptor, a missile interceptor used to destroy ballistic missile warheads in the upper atmosphere or just outside it. The Division also supported several other missile projects including a ground based radar and missile interceptor system which became part of the National Missile Defense (NMD) system in 1992. By the end of 1992, design of HEDI was complete, and construction was partially complete. The ground based systems moved to NMD were still in the design stage.<sup>2</sup>

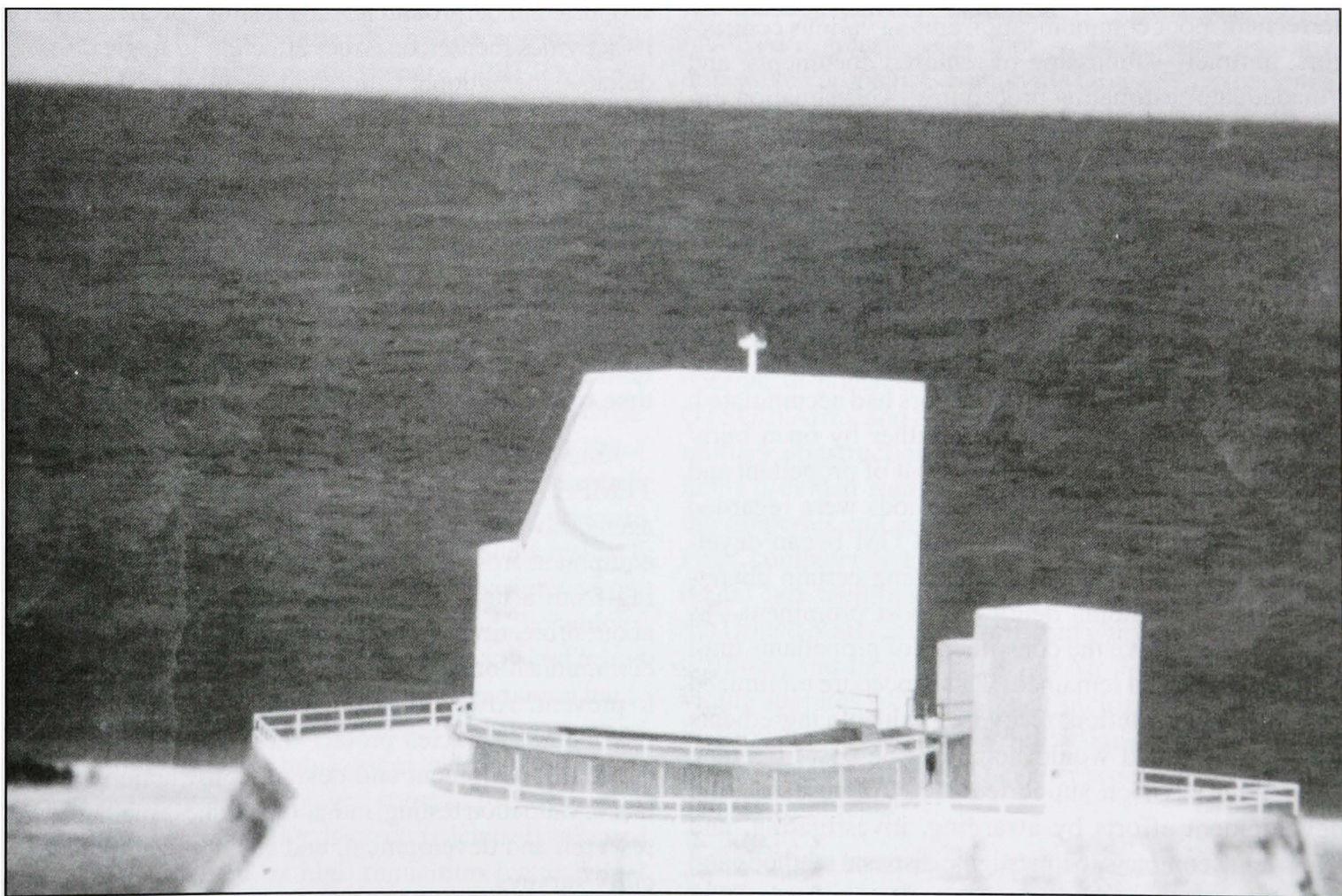
In addition to SDI missile launch facilities, Huntsville Division also worked on designs for SDI's Ground Based Free Electron Laser-Technology Integrated Experiment (GBFEL-TIE), an experimental laser weapon whose purpose was to provide protection against ballistic missile attacks. The Division supported the building of facilities to house GBFEL-TIE through the preparation of appropriate environmental impact documentation, assisting the Strategic Defense Command (SDC) in site selection, development of facility criteria, facility design, and engineering and management support for the construction effort. The developmental nature of the project and the "urgent" schedule necessitated innovative techniques for all phases. The project started in 1985, and in 1987 SDC selected the site, Huntsville Division let contracts, and construction began. The very next year, however, funding cuts slowed the project. Congress reduced the FY 1988 design budget by more than 50 percent and then to less than 20 percent of the expected level. Personnel slots could not be filled, and most activities slowed or ceased altogether. Finally, lack of funding terminated the project in 1990.<sup>3</sup>



Beginning in April 1992 Huntsville Division supported the National Missile Defense (NMD) Program, for which USASSDC was the executing agency. The purpose of NMD was to deploy antiballistic missile installations at various locations to protect the United States. On 2 April 1992 the Headquarters of the Corps of Engineers appointed Huntsville Division as Life Cycle Project Manager (LCPM) for all Corps of Engineers activities related to the NMD Program. The program had two major phases, testing and deployment. Huntsville Division's role included studies, planning, criteria development, and design and construction of facilities for that part of the program allotted to the U.S. Army for execution, including the Ground Based Radar, the Ground Based Interceptor, and the Ground Based Surveillance and Tracking System. Most of the testing involved facilities at Meck Island, Kwajalein, and White Sands Missile Range, New Mexico, but the program also

meant the partial reactivation of the old Stanley R. Mickelson Safeguard Complex at Nekoma, North Dakota. Late in 1990 the first steps were taken toward environmental restoration of that complex and development of a refurbishment plan. The designs were due to be complete by 1993.<sup>4</sup>

Huntsville Division's support of NASA began in March 1971, when NASA signed a Memorandum of Agreement with Huntsville Division, and since that time the Division had served as the single point of contact between the Corps of Engineers and NASA and had supported facility projects for the Apollo and Space Shuttle missions. Under a Memorandum of Agreement with NASA dated 21 April 1989 and revised on 4 May 1989 and 28 May 1991, the Division agreed to support the construction of facilities that would manufacture an Advanced Solid Rocket Motor (ASRM), which was



**Figure 12.** An artist's rendition of a Ground Based Radar at a Kwajalein facility.



necessary for launching components of the space station. Huntsville Division's main function was reviewing design of production facilities at Yellow Creek in Iuka, Mississippi, a former Tennessee Valley Authority nuclear facility site with some existing facilities that could be modified for use on the ASRM project. In addition, the Division was the primary point of contact with NASA's Marshall Space Flight Center (MSFC) and was Life Cycle Project Manager for Corps of Engineers support of MSFC in coordination with the South Atlantic Division, the Mobile District, and other Corps agencies. Huntsville Division also managed funds received from MSFC. After the summer of 1991 Huntsville Division became the government's design coordinator, a function previously performed by MSFC. While construction officially began on 10 April 1990, design continued through 1992, and the project was expected to be complete by the end of 1993. The most serious problems Huntsville Division had with this project were interrelated: poor communication among various contractors, untimely submission of required documents, and "inadequate" estimating procedures. This situation improved somewhat after May 1991 when Huntsville placed a technical liaison at the ASRM engineering center in Iuka.<sup>5</sup>

An additional service that Huntsville Division provided to missile agencies during this period concerned the Army Missile Command's (MICOM's) research into rocket motor disposal. Over the course of time, large stocks of obsolete solid rocket motors had accumulated, and the Army disposed of them either by open burn/open detonation or by water wash-out of propellant and case reclamation. Since these methods were regarded as environmentally unfriendly, MICOM began developing a laboratory-scale method using certain chemicals—liquid ammonia being the most prominent—as solvents to dissolve the constituents of propellants until only inert material remained. This procedure minimized air and water pollution, recovered valuable ingredients for recycling, and would hopefully be cost-effective. Huntsville Division supported MICOM research and development efforts by awarding, investigating, and overseeing contracts to investigate disposal methods and to develop design and cost criteria. Beginning in 1992 Huntsville Division supported the U.S. Army Defense Ammunition Center and School in investigating the eco-

nomic feasibility of marketing reclaimed propellants to commercial explosive manufacturing companies for use as a component in blasting agents, especially to the mining industry.<sup>6</sup>

The Advanced Technology Branch of Huntsville Division's Engineering Division had a different role in supporting space and missile technology. It helped design protective systems for USASSDC, MICOM, NASA, the Defense Nuclear Agency (DNA), and other agencies. Advanced Technology worked on research, development, test, and evaluation projects for the purposes of feasibility investigation and technology advancement. Through system hardening and survivability analyses, Advanced Technology investigated the effects of electromagnetic pulse, airblast, radiation, ground motion, hypervelocity impact, and heat transfer from weapons (both nuclear and conventional) and from the natural environment. Although Advanced Technology supported underground nuclear testing for SDI, most of its activities focused on issues affecting strategic offense/defense, the national Command, Control, and Communication (C3) network, and the survivability of other primary national assets. Advanced Technology could provide full support, including feasibility studies, criteria development, design, construction, validation testing, training, and life cycle maintenance of radiation hardened systems. In 1988 the branch suffered key personnel losses that were difficult to replace. These temporarily affected the section's capability, but since that time the number of its projects has multiplied.<sup>7</sup>

Among Advanced Technology's specialties was EMP/TEMPEST support for USASSDC and others. Many agencies were concerned about protection of electronic equipment from electromagnetic pulse (EMP) emanating from a high-altitude nuclear detonation and also about protection against accidental emanation of coded communications, which the TEMPEST program sought to prevent. After 1986 Huntsville Division helped various federal agencies protect their equipment through criteria development and design, construction surveillance, validation testing, radiation hardness maintenance, research and development, and standardization and facility surveys.<sup>8</sup>

Advanced Technology's other major area of expertise was supporting the Power Reliability Enhancement



Program (PREP). The objective of PREP was to ensure total system reliability and increase the survivability of electric power for Critical Command, Control, Communication (C3) and Warning Sensor Facilities. Between 1982 and the end of 1987, Huntsville Division and the Engineering and Housing Support Center (EHSC), later known as the Center for Public Works, identified thirty key sites. EHSC was responsible for performing site surveys and analyses to identify projects needing corrective action and for continuing evaluation of completed projects. The Division provided contract services, assisted EHSC with project identification, and served as the Technical Manager by developing project criteria, reviewing programming documents, developing a Design Features Manual, monitoring design and construction of selected projects, and coordinating joint construction acceptance. In August 1988 the Assistant Secretary of Defense announced major changes in the program: only the ten most critical C3 sites would be monitored under PREP; after those sites had been resurveyed, the Corps of Engineers would prepare a PREP Maintenance Management Features Manual as a companion to the Design Features Manual. The new surveys were to begin in FY 1989, pending funding, but the funding still had not come through at the end of 1992.<sup>9</sup>

Although Huntsville Division had continued in its original function of supporting USASSDC, the support of a variety of missile systems that were part of the Strategic Defense Initiative or the National Missile Defense Program had replaced the SAFEGUARD/SENTINEL mission. There were also other projects involving space and missile technology, including the Division's support of NASA's Advanced Solid Rocket Motor program and support for the Army Missile Command's research into solid rocket motor disposal. The Division had designed several facilities, and the Advanced Technology Branch of Huntsville's Engineering Division had tested and maintained a variety of equipment's radiation hardness, protection from electromagnetic pulse damage, and power reliability. Technological advancements or changes in funding had delayed some of these projects, nevertheless, Huntsville Division completed all assigned tasks and maintained its high reputation for technical expertise in the area of space and missile technology.

## V. PROCUREMENT MISSIONS

Huntsville Division has been involved in several procurement missions over the years. The Division had originally participated in procurement before 1982 in order to support the SAFEGUARD missile system, and because the Division had no geographic responsibilities, many Corps of Engineers Districts and Divisions, as well as other Army customers, began to utilize Huntsville's expertise in procuring government-furnished equipment and property. From 1988 to 1992 the Division had two major procurement missions, one for the Office of the Surgeon General (OTSG) and the other for the Chief of Army Reserves. Although the former was more spectacular, both were very successful. They involved a great deal of money, and neither had any unresolved problems. Huntsville Division's experience and expertise in contracting showed clearly with these programs.<sup>1</sup>

The first of the procurement missions with which Huntsville Division was involved during this period originated when the Office of the Surgeon General (OTSG) and the Division signed Memoranda of Agreement in 1982 and 1984 whereby Huntsville Division became responsible for supplying specified items for OTSG at Army and Air Force medical facilities, and for military construction projects worldwide. Among the items provided were furniture and furnishings (including draperies and art work), medical and dental equipment, computer systems, and even complete medical and dental care facilities. Most of the projects were within the United States, but a significant number were in West Germany and Japan. One major Air Force Project, providing supplies for a hospital at Incirlik Air Force Base in Turkey, was delayed by the Persian Gulf crisis, but it was completed in 1991. The other procurement projects had few problems.<sup>2</sup>

One of the most noteworthy projects for OTSG was the procurement of Magnetic Resonance Imaging (MRI) Systems and their installation, including the necessary building structure. MRI is especially effective for view-



ing soft tissue, and it is safer and more efficient than traditional X-ray imaging. It has more viewing flexibility and accuracy, it is non-invasive, and it has no known adverse side effects. It does have some disadvantages, including high expense and great bulk. A team of radiologists, physicists, and engineers meeting in Huntsville decided that, to eliminate the need for extensive and expensive hospital renovation, it would be preferable to use pre-engineered modular buildings to house each MRI unit. In 1989 the Division awarded General Electric Medical Systems the contract for the MRI systems, and between 1990 and 1992 MRI units were installed at thirteen military bases in the United States and one in Germany.<sup>3</sup>

In 1990 Huntsville Division became involved with a related OTSG procurement project, the Medical Diagnostic Imaging Support System. This integrated system acquires, transmits, displays, manipulates, and archives digital radiological and medical data. It is very fast, and it allows medical personnel to use the system from "remote" locations. The system is available to all federal medical treatment facilities (Army, Air Force, Navy, Veterans Administration, and Public Health Services). The Division had awarded nine sites by 1992.<sup>4</sup>

A third OTSG project involved the Computerized Tomography (CT) Beam Scanner. Because of Huntsville Division's success with the MRI program, in 1992 the Defense Personnel Support Center in conjunction with the U.S. Army Medical Material Agency requested the Division's technical support for the CT Beam Scanner Program. The purpose of this program was to improve the scanner system for Army, Air Force, and Navy hospitals. While the Defense Personnel Support Center dealt with contractor procurement and the CT system itself, Huntsville Division provided technical engineering support through participation in site meetings, design document evaluations, and facility inspections.<sup>5</sup>

One other service that Huntsville Division provided for OTSG was construction support. In addition to reviewing interior designs for medical facilities as required, the Division supported the Corps of Engineers Medical Facility and Design Office, which helped the OTSG Health Facilities Planning Agency provide architectural or engineering planning services for both existing and

proposed Army medical facilities. The primary role of the Division in this regard was to manage Architecture-Engineering (A-E) contracts. Because of rapidly increasing workloads, all parties involved began to use Indefinite Delivery Order contracts to accomplish short-term projects or tasks.<sup>6</sup>

Huntsville Division's other major procurement mission was for the U.S. Army Reserve. After signing a Memorandum of Agreement in August 1987, Huntsville Division embarked on a major furniture and furnishings procurement program for several Army Reserve Centers. In 1990 alone this program involved thirty-two sites in twenty different states, amounting to over three million dollars in contracts. There were no significant problems.<sup>7</sup>

Besides the major missions for OTSG and the U.S. Army Reserve, Huntsville Division was also responsible for procuring miscellaneous equipment and furniture for various customers such as the Defense Nuclear Agency, the Health Facilities Planning Agency, and the Unaccompanied Enlisted Personnel Housing Program. Most of the furniture and furnishings for both the Unaccompanied Enlisted Personnel Housing Program and the Army Reserve Centers were acquired from the Federal Prison Industries and shipped to various sites in the U.S.<sup>8</sup>

Huntsville Division successfully met all goals for its two major procurement missions, as well as for the several smaller missions. Whether attaining high-tech medical equipment like the MRI scanner for the Office of the Surgeon General (OTSG) or finding simple furnishings for the U.S. Army Reserve, the Division excelled in fulfilling its procurement obligations. Huntsville Division's expertise in procurement clearly contributed to the welfare of those agencies it served.



## VI DEFENSE ENVIRONMENTAL RESTORATION PROGRAM

A significant portion of Huntsville Division's work was centered around environmental projects. The Army's environmental management projects could be divided into four groups:

- pollution abatement—waste water treatment, solid waste disposal, hazardous waste
- materials management, and underground storage tank upgrades;
- restoration projects—eliminating pollution caused by past waste practices;
- land management—use of real property to protect natural and historical resources, including endangered wildlife;
- preparation of environmental impact statements in compliance with the Environmental Protection Act.<sup>1</sup>

The Division was involved in several environmental projects addressing these areas; most would fall under the authority of the Defense Environmental Restoration Program (DERP).

Since the mid 1970's concern for the environment had been growing across the nation. National, state, and local governments attempted many corrective and preventive measures to bring pollution under control, with federal government agencies leading the way. After the passage of the Clean Air and Water Acts of 1977, the Environmental Protection Agency (EPA) advised the Army of numerous violations of this act, and the Corps of Engineers became involved in supporting installation compliance. By 1978 Huntsville Division assumed management of the newly created Army Pollution Abatement Program. In 1980 EPA published regulations in response to the Resources Conservation and Recovery Act (RCRA), which legislated the management of hazardous wastes. As written by Congress in 1976, RCRA required "cradle to grave" care for each waste product.

Any installation managing large amounts of waste had to obtain a permit, which contained a detailed plan for handling the waste. RCRA was followed in 1980 by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which established a framework of guidelines for identifying, investigating, and cleaning up hazardous wastes to meet EPA standards. In order to meet the requirements of these laws, Congress began to develop environmental programs, such as the 1984 Environmental Restoration Defense Account, which called for the Department of Defense to inventory properties needing remediation.<sup>2</sup>

In 1985, Congress established the Defense Environmental Restoration Program (DERP) to perform environmental restoration of property belonging to, formerly owned by, or under the control of the Department of Defense. The program had three goals. The first involved identification, investigation, and clean-up (including contract supervision) of Hazardous and Toxic Waste (HTW); the second was detection and disposal of ordnance and explosive waste that could be dangerous to the public or the environment; and the last goal was building demolition and debris removal.<sup>3</sup>

Despite variations in project requirements, the environmental work on Department of Defense sites followed standardized procedures which can be broken down into three fairly consistent phases. The first phase was an inventory of possible sites. Huntsville Division maintained an inventory data base of all sites identified and was responsible for investigative activities at all sites except those in Alaska. The inventory process included a preliminary assessment/site investigation, whose purpose was to identify and investigate a site to determine its eligibility for environmental restoration. The original intention was to perform approximately five hundred site surveys per year. The final step in the inventory process was a confirmation study. Until 1986 Huntsville Division was responsible for managing all confirmation study contracts, but that year it developed a decentralization plan with one district in each division managing confirmation studies for its division. Some districts did not participate; thus, the decentralization plan was not implemented fully. After the confirmation study was completed, Huntsville Division prioritized and ranked projects for engineering and construction.<sup>4</sup>



The second phase of the DERP process was engineering evaluation and cost analysis. This phase began with feasibility studies, which were detailed field investigations meant to provide data for alternative remedies of the problem. These studies led to response strategies that resulted in a remedial design, a plan delineating how wastes were to be managed or removed. The Corps of Engineers Missouri River Division was responsible for all engineering on sites contaminated with hazardous and toxic wastes; Corps of Engineers districts did all engineering related to debris removal; and Huntsville Division was responsible for all ordnance removal engineering on formerly used sites. The definition of ordnance was bombs, warheads, guided and ballistic missiles, large and small arms ammunition, landmines, demolition charges, pyrotechnics, grenades, torpedoes, depth charges, containerized and uncontaminated high- and low-explosives and propellants, nuclear material, and chemical agents.<sup>5</sup>

The objectives of ordnance engineering were to proceed with the assessment and remediation of contaminated sites with minimum risk to humans. Ordnance removal followed steps similar to other environmental responses, with the primary differences being contamination and the results of exposure. Following studies of each site and the development of an ordnance remediation action, a contractor was hired, with work and safety plans reviewed by the Division, and the EPA acting as consulting agency. Before remediation began, the Public Affairs office held meetings and media days. Workers from the local district then systematically searched the area with sensitive metal detectors, excavated the located metal, and carefully containerized and if possible removed the ordnance to a remote location for detonation.<sup>6</sup>

The third stage of DERP, construction and remediation, lagged far behind the other two phases because it depended on the priority of the project and the



**Figure 13.** An ordnance site at Blackhills Army Depot in South Dakota.



availability of funds. The goal was complete restoration of sites, including the restoration of natural resources. The Corps of Engineers Districts were responsible for the supervision of all construction involved in this last phase.<sup>7</sup>

As it evolved, DERP came to include two major subprograms: the Formerly Used Defense Sites (FUDS) program was for inactive or abandoned Department of Defense properties, and the Installation Restoration Program (IRP) was for active facilities. Both had similar goals and used the same standardized procedures, but the former received more public notice because it involved civilians.

As described by one project manager, the goal of FUDS sounds relatively harmless: "The purpose of FUDS is to carry out a program of environmental restoration of sites formerly used by DOD."<sup>8</sup> The real danger involved, however, captured the public's attention. People actually handling the materials ran the greatest risk, but concern for the safety of adjacent population was significant. The problem of noise caused by detonation often increased concern.<sup>9</sup> The Public Affairs Office played an active role in dealing with the media and concerned citizens.

By the end of 1992 the DERP-FUDS inventory data base contained more than seven thousand entries of sites which potentially required action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). These sites had been identified by the Department of Defense, current owners, state regulatory agencies, and federal agencies. Approximately 250 preliminary assessments were completed in 1990 and four times that many in 1991. More than a thousand were done the next year, bringing the total to 4,592 by the end of Fiscal Year (FY) 1992.<sup>10</sup>

By that time, Huntsville Division's role within DERP-FUDS had changed in many ways. The most significant change was that the ordnance program began to emerge as a separate entity. The Division had developed explosive design and blast resistance technology to satisfy the needs of earlier missions such as support of Ballistic Missile Defense and the Ammunition Plant Design. By the time DERP was enacted, the Division already had some cleanup experience at Milan Army Ammunition

Plant, Katama Firing Range, Hawthorne Army Ammunition Plant, and others. The Headquarters of the Corps of Engineers came to rely on the Division for actions at sites where explosive safety and ordnance contamination was the primary concern. On 5 April 1990, Headquarters designated Huntsville Division as the Mandatory Center of Expertise (MCX) and Design Center for Ordnance and Explosive Waste (OEW). As MCX of OEW Huntsville Division had increased responsibilities, such as providing all OEW engineering for DERP and Base Realignment and Closures (BRAC). Then on 19 April 1992, Headquarters approved the Division's management plan, and the designation became official as well as practical.

There were other changes in DERP-FUDS. On 1 November 1992, Huntsville Division implemented a new data base, physically residing at the Waterways Experiment Station. The location of the database initially created some problems since the Division continued to be responsible for all inventory activities for all sites except those in the Corps of Engineers North Pacific Division in distant Alaska. However, the Division worked through these difficulties with closer management of inventory data. A third change was that confirmation studies/site investigations were no longer part of the inventory phase and were funded separately. Only fluctuations in FUDS funding remained constant.<sup>11</sup>

The other DERP subprogram was the Installation Restoration Program (IRP), which involved the Department of Defense's active sites. Under IRP, Huntsville Division performed services for the Defense Logistics Agency (DLA), the Army Materiel Command (AMC), and some installations directly through Reimbursable IRP. These services consisted of conducting environmental studies and following the standardized procedures (site investigations, feasibility studies, remedial designs, and remedial actions) in order to identify and correct environmental deficiencies.<sup>12</sup>

A large part of the work with active installations involved the management of wastes for the Defense Logistics Agency (DLA). Since 1984, Huntsville Division had developed engineering designs and provided management support for hazardous waste storage facilities at military installations for the Defense Reutilization and Marketing Service (DRMS), a subordinate command



of DLA. The DRMS has Defense Reutilization and Marketing Offices at Army, Navy, and Air Force installations worldwide, and these offices are responsible for disposal of excess Defense Department property, including hazardous waste. Storage of hazardous wastes for more than ninety days requires structures conforming to the Resource Conservation and Recovery Act (RCRA). On 16 June 1985 the U.S. Army Corps of Engineers and the DLA signed a Memorandum of Understanding whereby the Corps would support the DRMS Conforming Storage Minor Construction Program, whose purpose was to build safe storage facilities for DRMS. Because of Huntsville Division's reputation as an authority on RCRA, the Memorandum of Understanding identified Huntsville Division as design agent for DRMS minor construction conforming storage facilities within the Continental U.S. Huntsville Division would produce the required building design drawings and specifications, then provide those documents to one of fourteen Corps Districts responsible for site work design, building site-adaptation design, bid package preparation, advertisement, and award of construction. Any proposed changes affecting the building design would have to be approved by Huntsville Division and the customer prior to construction.<sup>13</sup>

By the end of FY 1987, when work for DRMS reached its peak of activity, Huntsville Division had produced standard designs for approximately fifty projects. The Defense Department Inspector General's report for that year, however, contained harsh criticism of DLA for the number of projects planned for construction and their high cost. The result was that DLA/DRMS proceeded with reevaluation of those projects and relaxed the design criteria to reduce costs.<sup>14</sup> During 1988 and 1989 the program was virtually at a standstill. Huntsville Division revised the standard design according to the new criteria to achieve construction savings and began project redesigns in 1990. By the end of 1992 two problems became apparent: escalating District costs and delays in applying for RCRA Part B Permits for storage, treatment, or disposal of hazardous waste caused by personnel shortages in DRMS.<sup>15</sup>

In addition to hazardous waste storage, Huntsville Division performed other services for DLA. The DLA operates a depot system. It purchases such supplies as

non-perishable food, medical supplies, petroleum products, construction supplies, clothing, and textiles for storage at seven depots. From these depots, the supplies are issued to military activities, federal agencies in the continental United States, and all overseas locations. Also part of the depot system is the Defense Fuel Supply Center at Cameron Station, Alexandria, Virginia, which manages the Defense Fuel Supply Points (DFSP) in the Continental U.S. and Alaska. The DFSPs stores and distributes vital petroleum and oil products. Huntsville Division had a reputation for handling special projects, for its contracting capability, and for its large group of geotechnical, chemical, and mechanical engineers familiar with contamination assessment and pollution abatement technology. Because of that reputation, Huntsville Division became the single point of contact within the Corps of Engineers for DLA groundwater quality and contamination assessment and hazardous waste remediation at DLA depots, DFSPs, and Defense Stockpile Centers.<sup>16</sup>

Another organization that Huntsville Division serviced under IRP was the U.S. Army Materiel Command (AMC). The Division's work for AMC involved pollution abatement activities, including air, water, and solid waste pollution with an emphasis on hazardous waste management, RCRA permitting actions, and compliance with CERCLA and its amendment, the Superfund Amendment and Reauthorization Act. Since late FY 1981, under a Memorandum of Understanding between AMC and the Headquarters of the Corps of Engineers, Huntsville Division had performed for AMC contract management and technical support for studies and designs, groundwater quality assessments at installations where contamination had been confirmed, and Hazardous Materials Minimization and solid waste management units investigations. However, most of the work was preparing the RCRA Part B permit applications, which involved making a detailed plan for the management of each waste.<sup>17</sup>

In 1985, 1986, and 1987 the emphasis shifted from Part B permits to working on the closure of lagoons, groundwater quality assessments, and remedial actions. On 12 March 1987 AMC and the Headquarters of the Corps of Engineers signed a new Memorandum of Agreement for the Installation Restoration Program



(IRP) for active army installations.<sup>18</sup>

Under the Headquarters, U.S. Corps of Engineers' 1988 Hazardous and Toxic Waste management plan, Huntsville Division continued to support all AMC projects under Corps of Engineers Missouri River Division management. Requiring permits for Open Burning/Open Detonation was initiated in FY 1988. In FY 1989 contracting began for explosive waste incineration and writing RCRA permit applications for deactivating furnaces. The U.S. Army Toxic and Hazardous Materials Agency was designated the central program manager of the U.S. Army IRP. Huntsville Division and other commands would execute all assigned AMC projects, such as site investigations, feasibility studies, remedial designs, and remedial action projects. In FY 1990 Huntsville Division awarded contracts for remedial action for ordnance, HTW material, low-level radioactive waste contamination, and underground storage tanks. In FY 1992 the Division awarded contracts for AMC management support and HTW/ordnance investigation, studies, and remedial actions.<sup>19</sup>

In 1992, however, the Headquarters of the Corps of Engineers initiated a policy of decentralization. All new AMC projects would be assigned to major subordinate commands. Huntsville Division would execute ordnance projects and any projects already begun, but it would not begin any new contracts in FY 1992. Individual projects would be transferred to the designated Hazardous and Toxic and Radiological Waste geographic district "at an appropriate point." By the end of 1992, work on projects slowed pending announcement of a plan for reorganization of the Corps, and the expectation was that by the end of FY 1994, Huntsville Division would not have any active Army IR projects, though in fact, the Division continued to be involved in AMC projects to some degree.<sup>20</sup>

Huntsville Division also provided support for installation restoration projects which do not fall under either the DLA IRP or the AMC IRP. Since these projects were funded directly by the installations, they were performed on a reimbursable basis. Originally, the title given to the program at Huntsville Division was Work for Others, but because of confusion this title creates, the name was changed to Reimbursable IRP in 1992. As required by the Hazardous, Toxic and Radioactive Waste Man-

agement Plan (March 1992), the Division did not begin Reimbursable IR work until after contacting the Corps of Engineers Design District which supported the geographic area of each installation. However, if the design district would not be able to assume the work, for whatever reason, Huntsville Division could provide the requested support.<sup>21</sup>

The Office of the Deputy Assistant Secretary of Defense for Environmental Affairs (ODASD-E) was one of Huntsville Division's most significant customers. Because that office developed environmental policy and implementation guidance for the Department of Defense, it required impact analyses, engineering studies, and other reports. Huntsville Division had provided such support since 1984, including maintenance and operation of the DERP Information System, preparation of the DERP Annual Report to Congress, development and refinement of the Defense Priority Model, and other technical policy support. Since 1990, at ODASD-E's request, Huntsville Division has supported Base Closure and Realignment (BRAC).<sup>22</sup>

The several BRAC programs are the result of Congressional action to reduce the size of the Department of Defense. BRAC included combining functions of some installations and eliminating others, with the result that some surplus Defense Department real property could be transferred to other owners. By law, before transfer of real property from the U.S. Government to any other entity or person, it is mandatory to list all hazardous substances ever stored or disposed of on the site with a description of any remedial actions taken. The department must issue a covenant warranting that all remedial actions necessary to protect human health and the environment with respect to any such substances remaining on the property have been taken before the date of the transfer. Huntsville Division had performed site investigations and environmental assessments for several installations, and as Mandatory Center of Expertise (MCX) for Ordnance and Explosive Waste (OEW), Huntsville Division was responsible for ensuring that OEW contamination has been properly investigated at all BRAC sites.<sup>23</sup>

Despite the success of these environmental missions, two constant problems Huntsville Division had with DERP were inadequate funding and shortage of skilled



manpower. DERP funding fluctuated widely, with the program suffering the most drastic funding cuts in 1988, resulting in slowed activities. Furthermore, not until 1992 did the Project Management Directorate, Environmental Program, reach 100 percent of staffing. In 1990 Huntsville Division's designation as the Mandatory Center of Expertise (MCX) for ordnance and explosive waste (OEW) resulted in increased work. In response to the growth in DERP, later that year the Chemical Stockpile Demilitarization Program (CSDP) was organized as a separate directorate.<sup>24</sup>

In addition to DERP, Huntsville Division became involved in two other environmental programs. Since 1990 the Division had been involved in the design of an Effluent Treatment System (ETS) for high temperature gas effluent resulting from a classified research and development test effort related to the Space Nuclear Thermal Propulsion Program. This project was on hold in 1992 pending a decision on the future of the entire program.<sup>25</sup>

Another environmental program in which Huntsville Division assumed the lead in 1990 was Partners for Environmental Progress (PEP). This program was designed to identify privatizing opportunities in the environmental service areas of water supply, wastewater treatment, solid waste, and waste-to-energy. Also, Huntsville Division would develop new model contractual agreements for use in the privatizing effort. The initial plan called for a tripartite organization of the PEP program, involving Corps of Engineers partnerships with state and local governments, partnerships with the Environmental Protection Agency and other federal agencies, and assistance to Army installations. However, the third aspect never materialized because the Assistant Secretary of the Army (Installations, Logistics, and Environment) did not pursue any direct Army involvement in the PEP program. Work progressed to the point where Huntsville Division selected several Market Feasibility Study (MFS) projects in 1991 and 1992, and some were completed. In October 1992 the PEP program was transferred to Headquarters, but the Division continued to support technical reviews, propose MFS projects, and complete MFS reports.<sup>26</sup>

Although PEP and the Effluent Treatment System (ETS) received some attention, Huntsville Division's primary environmental mission was the implementation

of DERP, which was concerned with identification and remediation of both inactive installations through the Formerly Used Defense Site (FUDS) program and active installations through the Installation Restoration Program (IRP). The bulk of the Division's DERP responsibilities lay in the inventory process and engineering the removal of Ordnance and Explosive Waste (OEW), for which it was the Mandatory Center of Expertise. The number of sites that Huntsville Division assessed by the end of 1992 are impressive, but as this is only the first step in environmental restoration, there is much work ahead for the Division.

## VII CHEMICAL DEMILITARIZATION

Related to environmental restoration was Huntsville Division's work in providing program management, contracting, engineering, and construction support for the destruction of U.S. stockpiles of lethal and toxic chemical agents and munitions, for which there has been increasing local, national, and international concern. There were several problems with chemical stockpile disposal, including political opposition, international difficulties, and cost inefficiencies, but despite these problems, Huntsville Division had achieved several successes by the end of 1992: construction on disposal plants in the South Pacific, in Arkansas, and in Utah had moved forward, and Huntsville had begun designs on several other facilities.

Like many military projects, the Army developed its chemical demilitarization program over several years. In the late 1960's and 1970's the Department of the Army directed that certain chemical munitions which were obsolete and/or surplus should be destroyed in an ecologically safe way. In 1971 the Foreign Military Sales Act Amendment (Public Law 91-672) directed the U.S. Department of Defense to destroy chemical weapons from the Far East depot outside the U.S. Okinawa had been the chemical depot for the Far East; but in 1972, before that island was returned to Japan's sovereignty,



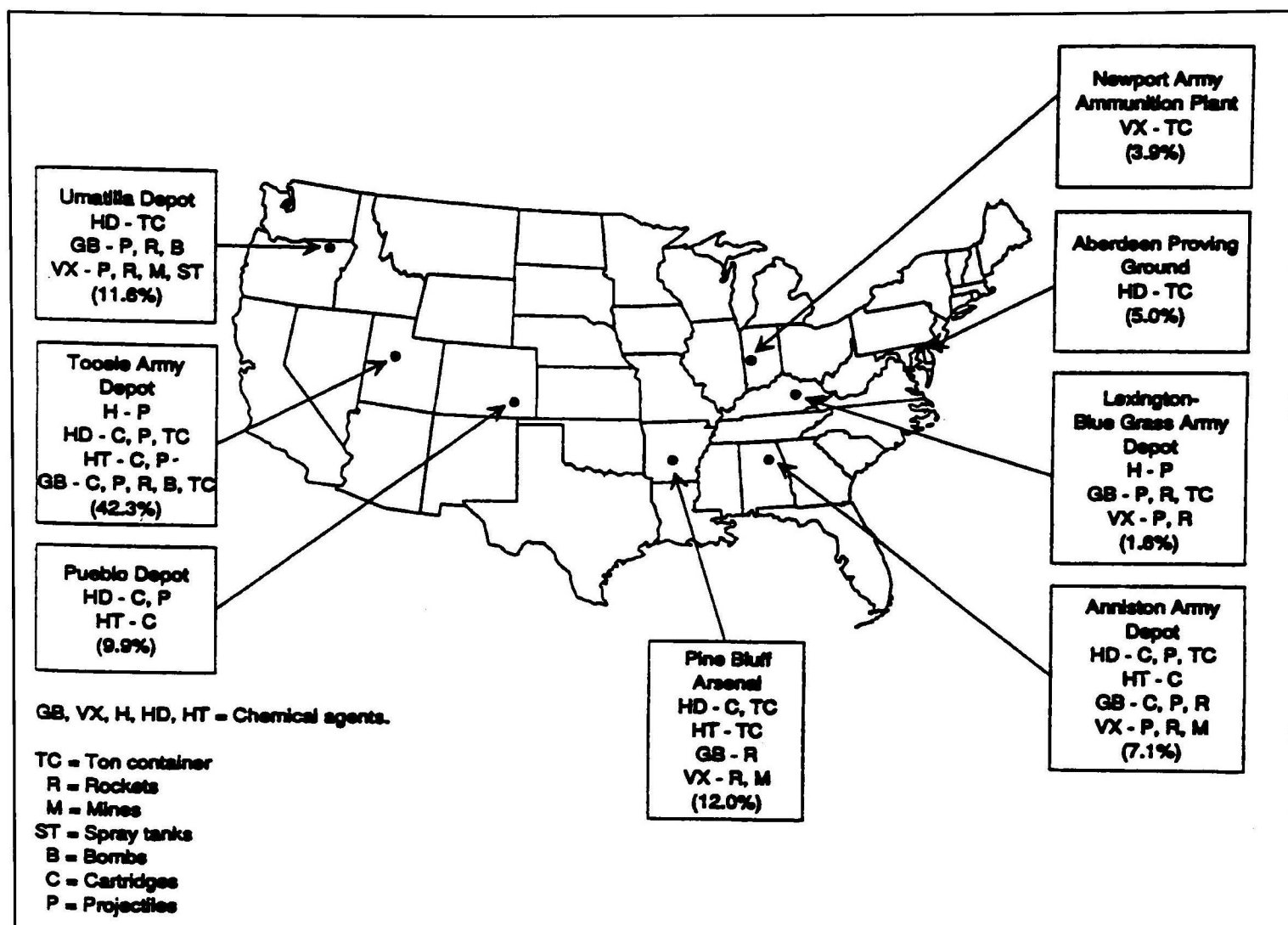


Figure 14. CSDP/Stockpile Distribution.

those stocks were moved from Okinawa to Johnston Atoll because Public Law 91-672 prohibited their return to the continental United States. Since the Marine Protection, Research, and Sanctuaries Act of 1972 (Public Law 92-532) "prohibited ocean dumping of chemical weapons," the designs of facilities at Johnston Atoll were to explore other methods of disposal. Then in the early 1970's, the destruction of M34 cluster bombs began at the Rocky Mountain Arsenal in Colorado, and the technology gained there was used in developing the Chemical Agent Munitions Disposal System (CAMDS) pilot facility at Tooele Army Depot in Utah and in further development at the Rocky Mountain Arsenal. The pilot program begun at Tooele in 1982 was quite efficient in disposing of all types of chemical munitions, but as a pilot program, its capacity was limited.<sup>1</sup>

By the early 1980s concern had grown about the risk of deteriorating chemical weapons. The national and international climate manifested increasingly urgent concern about eliminating all chemical weapons and munitions. In August 1981 the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) signed a Memorandum of Understanding with Huntsville Division to establish a program for demilitarization of obsolete chemical munitions. Then in 1986 Congress directed the Secretary of Defense to destroy the U.S. Chemical weapons stockpiles in a safe and effective manner by 1994, a completion date that was extended. Because of concerns that disposal facilities would be used for continued waste disposal after the stockpiles were destroyed, Public Law 99-145 of 1986 provided that the facilities constructed would be used only for



destruction of weapons and munitions; once the stockpile was eliminated, the facilities would be dismantled and removed.<sup>2</sup>

From 1981 when it signed the Memorandum of Understanding with USATHAMA, Huntsville Division provided engineering support to the Chemical Stockpile Disposal Plan (CSDP). It was and is the aim of CSDP to destroy U.S. Chemical weapon stockpiles at Johnston Island in the Pacific Ocean and eight Army bases in the Continental U.S.: Tooele Depot, Utah; Anniston Ordnance Depot, Alabama; Umatilla Army Depot, Oregon; Pine Bluff Arsenal, Arkansas; Pueblo Army Depot, Colorado; Lexington Blue Grass Army Depot, Kentucky; Aberdeen Proving Ground, Maryland; and Newport Army Depot, Indiana (see Figure 14). There was also to be a training facility at Aberdeen Proving Ground and a BZ disposal plant at Pine Bluff. By 1988 Rocky Mountain Arsenal had ceased to be an active chemical demilitarization facility. As the chemical demilitarization program grew, so did Huntsville's role. In 1990 the Chief of Engineers designated Huntsville Division as the Life Cycle Project Manager (LCPM) for all Corps involvement in the CSDP. In 1992 the Corps of Engineers designated Huntsville Division as construction agent for the CSDP. This new responsibility was a factor in the reorganization that year of the Chemical Demilitarization Directorate into three separate divisions (construction, project management, and design management and integration), as well as the establishment of resident offices at seven construction sites with an anticipated workforce of up to 281 people.<sup>3</sup>

As CSDP evolved, the Army carefully considered plans for chemical demilitarization and the appropriate technology to be used. In 1988 the Army considered two possible plans for disposal of chemical weapon stockpiles: on-site disposal at each of the stockpile locations or relocation of munitions to one or more central disposal sites or storage facilities. The Army selected the former solution, the rationale being that "any accident on an existing Army base would be easier to mitigate than an accident at some unknown point along a transportation route." Therefore, the plan that the Army developed for chemical weapon disposal was to build plants at each of the nine stockpile sites to destroy chemical munitions.<sup>4</sup>

Also in 1988, Congress directed the Secretary of Defense to provide Congress with written proof of evaluation, including testing, of alternative technologies for disposal of existing stockpiles. There are specific requisites for a disposal technology to be successful: "[It] must be able to effectively destroy or decontaminate the chemical agents, the drained and empty munitions and containers, the associated explosive and propellants and the munition packaging material (dunnage). The Army's current system incorporates all these waste streams."<sup>5</sup> Various federal agencies, both military and non-military, have proposed alternative methods of disposal, and some have been tested, but none so far have met all the criteria, and all are in the early developmental stages.<sup>6</sup>

Although the Army was to continue research on disposal methods, one method did gain approval for CSDP. Previous to 1988, several disposal methods had been used: open-pit burning, evaporation, burial, ocean dumping, chemical neutralization, and incineration. Since 1982 incineration has been the officially approved method, and in 1988 the army designated on-site disposal, consisting of disassembly followed by incineration, as the preferred method of chemical weapons destruction. The process relied upon the robotic disassembly of chemical weapons for each type of munition as appropriate. Such waste materials as the chemical agent, explosives and propellants, empty munitions and non-explosive storage containers, shipping and packaging materials were incinerated separately. This separation produced wastes that were relatively similar, making it possible to incinerate each under optimal conditions. Any gases or other products of incineration that remained were treated with pollution abatement equipment, such as a quench tower, venturi scrubber, scrubber tower, demister, and a furnace used for removal of particulates. The scrubbers reduced the wastes to a brine, which evaporated. The resulting salts were then packed in metal drums for eventual landfill. In the end, the only by-products remaining were scrap metal, drums of salt, and ash.<sup>7</sup>

A Cryofracture/Incineration Demonstration Plant (CIDP) has aroused intermittent interest as an alternative to the reverse assembly/incineration process. Munitions would "be cooled in a cryogenic bath, crushed by a hydraulic press, and then incinerated in high tem-



perature kilns.”<sup>8</sup> Enough research and testing were done by the Corps of Engineers and contractors to warrant scheduling of the completion of the process and facility designs by 31 May 1992, a date subsequently revised. Jacobs Engineering Group completed the concept design, GA Technologies (General Atomics) 95 percent completed the process design, and the facility design proceeded to about 35 percent before the Secretary of the Army canceled the project. The FY 1989 appropriation bill included a full-scale plant, but Congress suspended the project in October 1988. In December 1989 the Program Manager of Chemical Demilitarization directed Huntsville Division to execute a contract to continue the Cryo developmental testing program. Other parts of the project also proceeded subsequently. At the end of 1992 the Assistant Secretary of the Army for Installations, Logistics, and Environment decided to cancel the plan to construct a Cryofracture Plant because of funding and scheduling problems.<sup>9</sup>

The Army's disposal program encountered several political and technical problems. One problem was the pressure of time. It was imperative that chemical weapons be destroyed as soon as possible. One reason for this was that low-level leaks had been detected in some munitions, and although the hazard level was estimated to be low, the Army considered it important to prevent further leakage. Another reason for proceeding with “all due speed” was the escalating cost of the program. In 1988 the Army's estimate of the total cost of the program was \$3.4 billion; 1992 estimates were as high as \$7.9 billion. Construction of the facilities was a very small part of the cost. The biggest expense was for operations.<sup>10</sup>

An additional problem was that opposition, both local and national, delayed and even prevented implementation of some aspects of the plans for disposal. State regulation (by executive order, legislation, or permit manipulation) is one of the more effective obstacles at present. These regulations were reactions to several issues, the most important being health risks and the fear that the Army was “sneaking” in additional weapons for destruction. Opposition to parts of the disposal program indicate that ultimately it will be necessary to address the social and political as well as the technical issues. Difficulties arising from citizen protests and government

regulation demonstrate that only a collaborative effort will be successful.<sup>11</sup>

Disposal was an international, not just a national, problem. The U.S. and the former Soviet Union signed an agreement in 1990 to destroy all their chemical weapons, but only some of the provisions were implemented because neither country ratified the agreement. One problem is that the former Russian republics lack adequate facilities for destruction. As many as two dozen nations may have chemical weapons, and inspection and verification would cause problems. On July 1992 the U.S. and Russia signed an agreement for U.S. assistance in demilitarizing Russian chemical weapons. Huntsville Division was named agent for this mission, its role being to prepare a concept plan.<sup>12</sup> However, the initial visit to Russia by Kevin Flamm, United States Army Chemical Disposal Agency, late in 1992, was not productive because the Russians would not turn over their concept plan until it was approved by local authorities.<sup>13</sup>

There were also some serious financial problems associated with chemical demilitarization. Obviously, no one had much experience with building chemical demilitarization facilities. The creation of the Johnston Atoll Chemical Agent Disposal System (JACADS) proceeded with surprising smoothness, but the Tooele Chemical Demilitarization Facility (TOCDF) was beset with problems. Cost overruns are virtually routine, especially in an inflationary economy, but the cost overruns at TOCDF seemed excessive. Two differences from JACADS contributed significantly to problems with cost control at TOCDF. First, the designs for TOCDF were not as complete as those for JACADS had been. Because of schedule pressure, the TOCDF project was advertised for bids before the design was completed. The bids were based on an incomplete design, and when the design was later finished, it became apparent that the construction was more complex than anticipated in the bids. Secondly, the contracting methods differed between JACADS and TOCDF. JACADS was built through a series of fixed price contracts. This allowed the construction to proceed one step at the time and reduced the risk of nonperformance. For TOCDF, one cost-reimbursable contract was used for the entire project, from construction through closure. The construction proceeded as quickly as possible because of

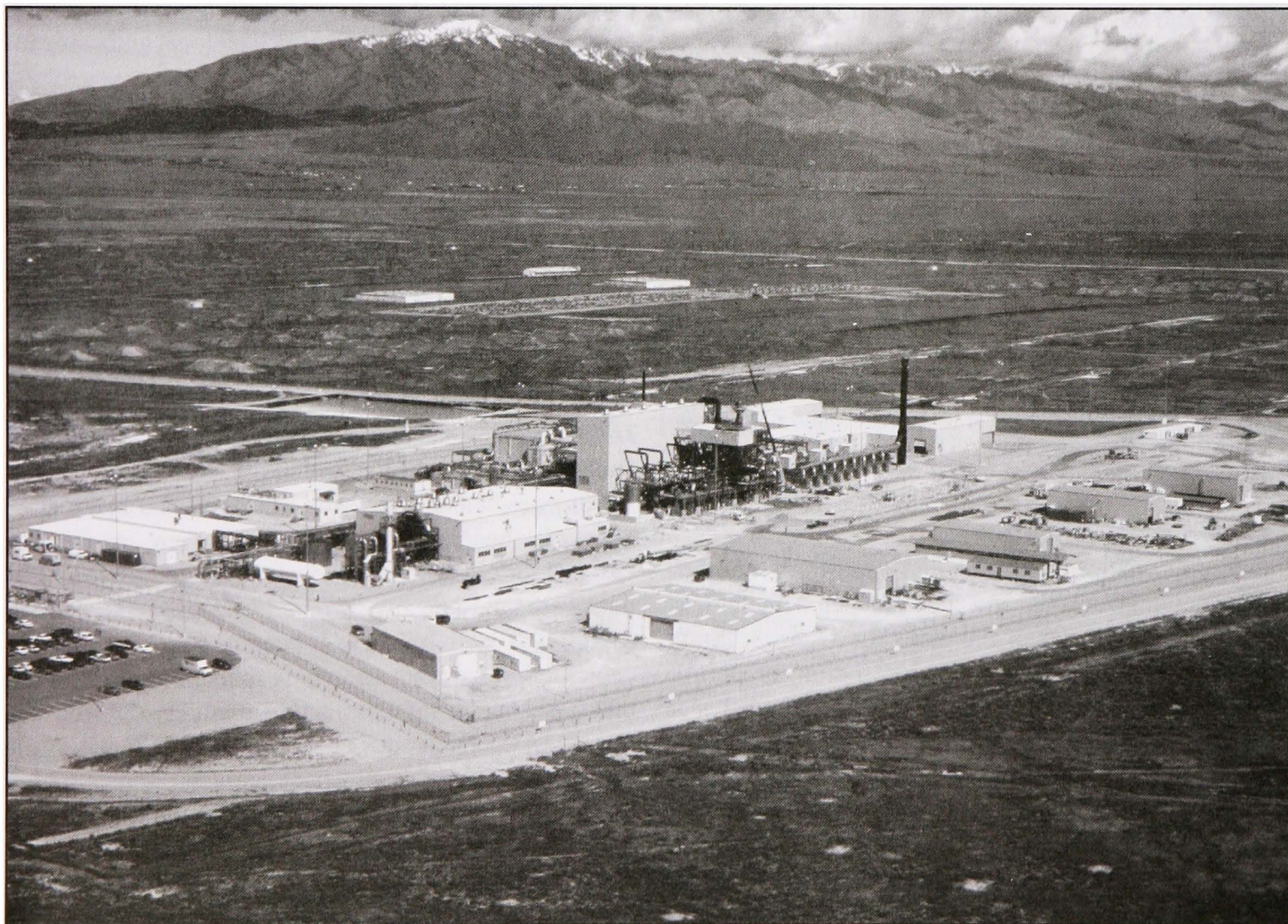


the schedule pressure, and the risk of nonperformance was on the Government. TOCDF was 74 percent complete as of 1 December 1992, and the “lessons learned” from its design and construction were applied to the Anniston Chemical Defense project, which was advertised with a complete design and will be constructed using a fixed price contract.<sup>14</sup>

Considering the difficulties involved, the program made some amazing achievements. The BZ disposal plant at Pine Bluff Arsenal, Arkansas, whose purpose was to destroy the obsolete incapacitating chemical agent BZ, began operation 9 May 1988. Workers at the plant rendered munitions inert, incinerated the BZ-filled munitions and liquid wastes, and decontaminated the metal parts. By 20 January 1990 all M43 and M44 munitions, the Neat BZ, and the entire drummed inventory at that

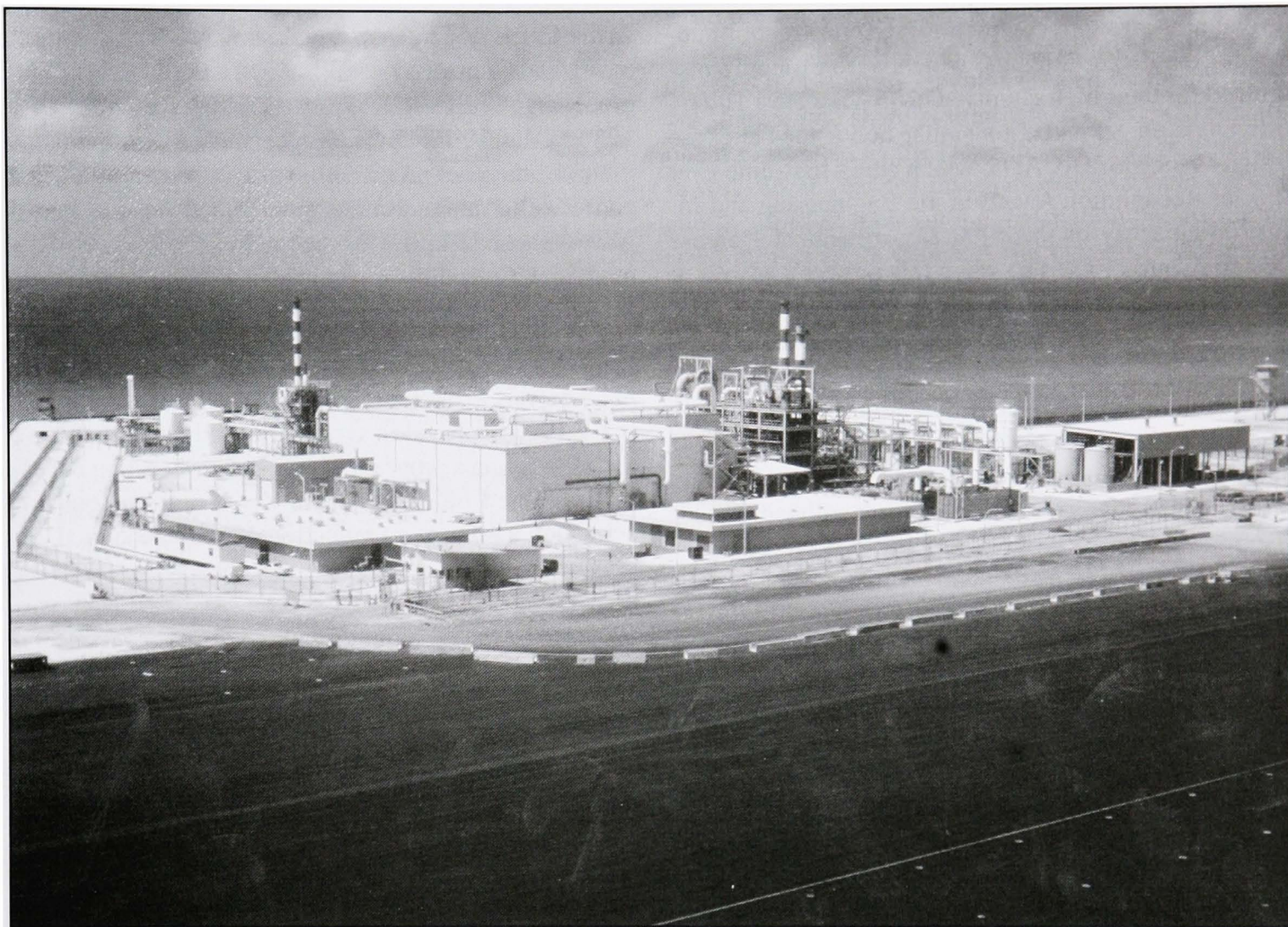
facility had been destroyed. The facility itself was decommissioned and the property restored to the government. Huntsville Division had provided design, installation, testing, and personnel training.<sup>15</sup>

In 1989 work had begun on the Central Demilitarization Training Facility at Aberdeen Proving Ground, Maryland. This facility was to train workers to operate and maintain the eight chemical munitions demilitarization plants which were to be built in the Continental U.S., including the future plant at Aberdeen Proving Ground. Also in 1989, construction began on the Tooele Disposal Facility in Utah, the first of the eight plants scheduled to be opened in coming years and incidentally the one with the largest stockpile in the Continental U.S. However, the plant would not begin operation until the testing at JACADS was complete.<sup>16</sup>



**Figure 15.** The TOCDF facility under construction.





**Figure 16.** The JACADS facility.

By April 1990, JACADS had progressed to the point where verification and testing could start, so the facility went “hot” and began to destroy chemical weapon stockpiles. The destruction process at Johnston Atoll was the epitome of automation. Human workers observed via television the operations conducted by robots and computers, while carefully monitoring all operations for the accidental release of chemical agents. In July, the Department of the Army announced its intention to use Johnston Island for the storage and destruction of stockpiles in Germany, as well as those in Asia.<sup>17</sup>

In July 1991 the Department of the Army reaffirmed its decision to go forward with the construction of the Anniston, Alabama, Chemical Disposal Facility. The stockpiles in Anniston to be destroyed include mustard and nerve agents in projectile, mortar, rocket, land mine,

and ton container form. Three other facilities remained in the design stage in 1991 and 1992 whose construction were expected to begin by 1993: Pine Bluff Arsenal, Arkansas; Umatilla Depot, Oregon; and Pueblo Depot, Colorado. The designs for the other three “low volume” sites, Lexington Blue Grass Depot, Kentucky; Aberdeen Proving Ground, Maryland, and Newport Army Ammunition Plant, Indiana, were temporarily suspended by a 1992 Congressional directive until research into alternative technologies was complete.<sup>18</sup>

The Army’s plan for chemical demilitarization had proceeded rapidly. The facilities at Johnston Island, based on earlier prototypes, had begun the disposal of chemical weapons. Plants at five of the eight U.S. stockpile sites were either under construction or in planning. Huntsville Division had been responsible for much of



the planning, designs, contracting, and construction support for the disposal plants, which were officially recognized for their high quality. On 15 May 1991 Huntsville Division achieved a singular honor for being the design agency for JACADS, which won a first-time-ever Special Recognition Award in the Engineering and Industrial category of the 1990 Department of Defense Design Awards. The jury cited this project's advanced engineering in materials handling and disposal of toxic chemicals.<sup>19</sup> Although the Division encountered many problems along the way, it had exceeded demands within the chemical demilitarization program.

## VIII ENERGY AND FUEL

Huntsville Division was involved in several energy-related programs from 1988-1992. For over a decade the Division had supported two conservation programs whose purpose was to reduce energy consumption in government facilities, and Huntsville continued to be involved with them. More recently introduced were three other programs which sought to decrease government energy costs through contracting or alternative financing, an area where the Division has repeatedly shown its expertise. In addition to these programs, the Division also supported the Defense Logistics Agency (DLA) in its effort to store and distribute petroleum fuel products for the Department of Defense.

Interest in energy programs has fluctuated over the years, but Huntsville Division's involvement with energy and fuel has been fairly steady. In 1975, the Energy Research and Development Administration, which later became part of the Department of Energy, signed a Memorandum of Understanding with the Corps of Engineers wherein Huntsville Division would provide technical and administrative support for programs demonstrating the potential and feasibility of converting coal into cleaner fuels. By 1979, the Division supported the Department of Energy in the Strategic Petroleum Reserve, an effort to conserve energy through better fuel management. Also in the 1970's, the Army initiated several energy conservation programs that involved the

Army Corps of Engineers, including the Energy Monitoring and Control System (EMCS) and the Energy Engineering Analysis Program (EEAP). By the early 1980's, Huntsville Division received task assignments in these and other programs dealing with energy or fuel conservation and fuel conversion. Interest in energy programs reached its peak during the Reagan-Bush era, but has begun to decline in recent years.<sup>1</sup>

One of the most successful energy programs which Huntsville Division supported was the Energy Engineering Analysis Program (EEAP). EEAP was established in FY 1977 to provide a systematic method of analyzing and structuring a program of energy conservation in federally-owned buildings, with the long-term goal of achieving a 40 percent reduction of average annual energy use per gross square foot of floor space by the year 2000 using 1975 as the base year. At first EEAP was managed by the Headquarters of the Corps of Engineers, which worked directly with the geographic divisions and districts; then for almost a decade, from 19 January 1980 to the beginning of FY 1990, Huntsville Division managed the EEAP. The Division distributed its management plan on 26 March 1980 and revised it on 1 August 1984. By the end of 1989 the local divisions and contractors had completed analysis of the energy use and needs of more than two hundred major army installations and developed projects for energy conservation. The analysis of each installation had three phases. Phase I included data gathering, inspection, and field trips. Phase II was analytical: analysis of data, feasibility and economic studies, evaluation, and identification of projects. Phase III was project development, including minor construction projects. The Army met or exceeded short-term conservation goals established by executive order in spite of budgetary constraints. In November 1988 the Headquarters of the Corps of Engineers, in accordance with its policy of decentralization, decided to make the Field Operating Activities (FOAs) responsible for EEAP studies at the end of FY 1989. The Corps of Engineers Mobile District became the new Technical Center of Expertise to assist the FOAs. A Procedures Manual replaced the Management Plan, and Headquarters became manager of EEAP again. For all practical purposes, this ended Huntsville Division's role in EEAP.<sup>2</sup>

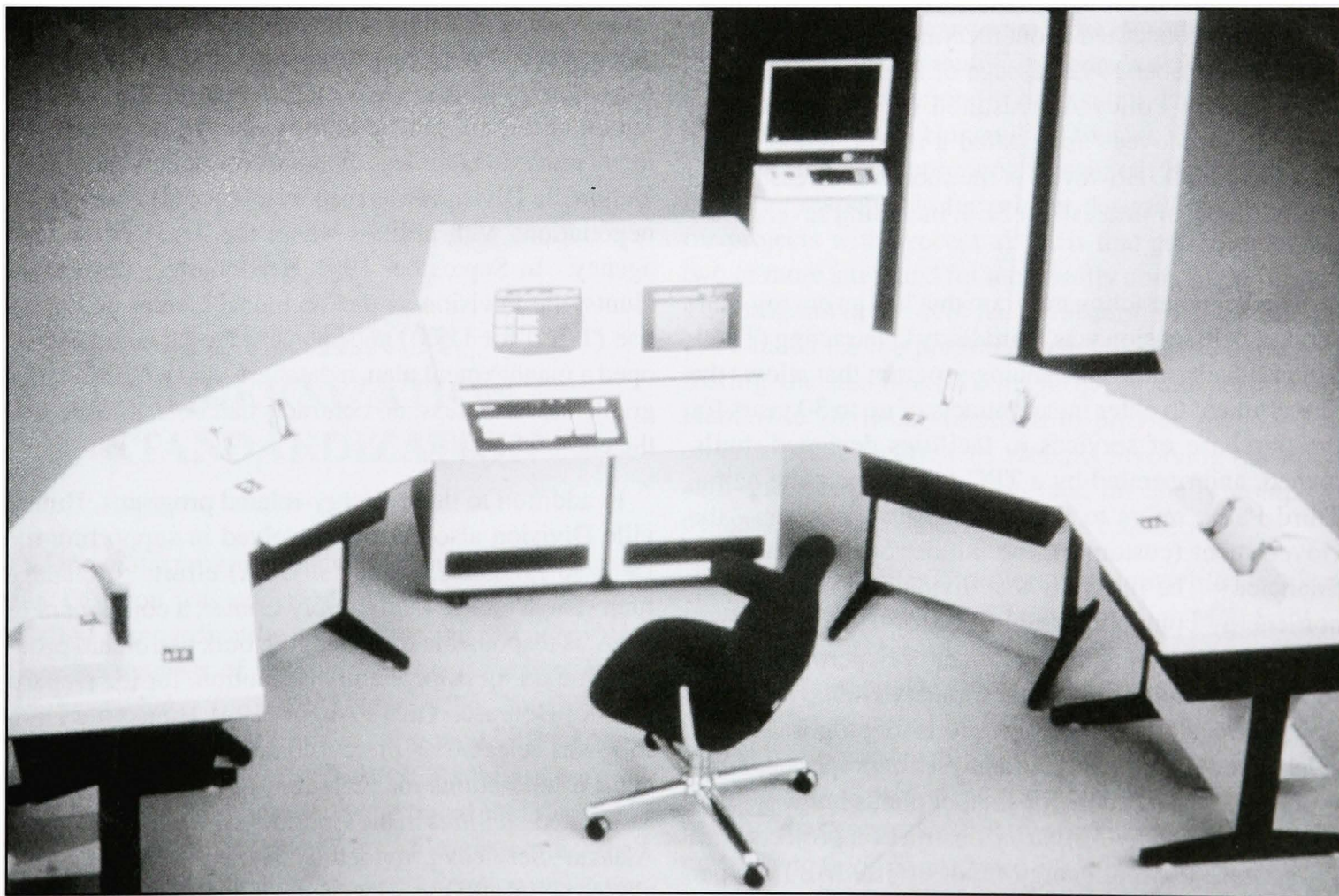
A second conservation program with which Hunts-



ville Division had been involved for several years was the Energy Monitoring and Control Systems (EMCS), subsequently known as the Utilities Monitoring and Control Systems (UMCS). On 7 June 1979 Huntsville Division became what would later be recognized as the Mandatory/Technical Center of Expertise (MCX/TCX) for EMCS/UMCS programs located at Army bases in the Continental U.S. This program is under the authority of the U.S. Army Forces Command Environmental and the Energy Enhancement and Improvement Program. EMCS is a computerized system which conserves energy by controlling and monitoring heating, ventilating, air conditioning, and lighting systems from a central location.<sup>3</sup> In addition to coordinating EMCS throughout the Corps of Engineers, Huntsville Division prepared criteria for EMCS projects and provided technical assistance during design, construction, and testing to Corps of Engineers FOAs, the Air Force, and the Navy. When requested, Huntsville Division designed EMCS projects,

from project site surveys through the delivery of completed project design packages and procurement. As directed by Congress, savings created by this program are shared; one share is returned to the U.S. Treasury, one is reinvested by the Department of Defense the following fiscal year for installation conservation effort, and the third is spent by the installation on any authorized project of its choice. The biggest problems for this program have been reduced funding and loss of technical expertise "at a very high rate." Like other U.S. Forces Command support efforts, this one is complementary to Shared Energy Savings (SES) projects.<sup>4</sup>

Shared Energy Savings (SES) was one of several programs Huntsville Division supported that tried to reduce energy spending through contracting. The SES program is based on a contractor providing, modifying, or operating and maintaining a facility in a way that is expected to decrease energy consumption. The contractor and the government share, according to the contract, the sav-



**Figure 17.** An EMCS console.



ings resulting from the increased efficiency. Since 1984 Huntsville Division has managed the pilot program and developed appropriate contracting procedures. The Division awarded the first contract on 7 September 1988, and the pilot program (with projects at Corpus Christi, Fort Bliss, Fort Shafter, White Sands, Fort Bragg, and Fort Eustis) was completed in April 1990, except for Fort Eustis. The most serious problem was the complexity of the accounting process required to figure the savings, and Huntsville Division developed a software package program to aid in determining the feasibility of using an SES contract. As a result of the success of the pilot program, Huntsville Division was designated the Army Technical Center of Expertise (TCX) for SES projects, and several more projects (some of them very large indeed) were initiated. By April 1992, however, the U.S. Senate had passed a bill eliminating ancillary savings (maintenance, environmental, etc.) and requiring that contractors guarantee the amount of savings, thereby reducing the appeal of the SES program to those contractors concerned about meeting their original estimate. In October 1992 passage of the National Energy Conservation Policy Act resulted in further changes. Division employees anticipated a drastic reduction of interest in SES. However, in the short run at least, there was a "flurry of interest" in SES, including several new projects in 1992.<sup>5</sup>

Another contracting program that had an energy-conservation dimension was Third Party Contracting (TPC). This is an alternative financing program that allows the Government to enter into contracts of up to 30 years for the purchase of services in facilities designed, built, owned, and operated by a TPC contractor. The name, Third Party, refers to the three primary partners—the Government (customer), the builder/operator, and the financier.<sup>6</sup> The program was divided into energy and non-energy components. On 11 July 1983 Huntsville Division was designated the Center of Expertise for TPC energy opportunities. In that capacity Huntsville Division provided preparation of requests for proposals, technical reviews, and economic analyses of proposals. After 1986 TPC was optional for smaller plants but was mandatory for all Army Military Construction projects with a minimum thermal energy input of 100 MBTU's per hour. In 1987 the non-energy category included a wastewater treatment plant, a laundry, transient quarters, and

a maintenance facility. In August of that year Headquarters designated Huntsville Division as the responsible party for studies and contracting operations for military wastewater treatment plants and potable water processing plants. Changed tax laws (including those pertaining to depreciation of equipment) made it unlikely that TPC would be economically feasible. No TPCs were under consideration in FY 1992.<sup>7</sup>

Huntsville Division's newest energy-related program during this period was Demand Side Management (DSM), which is yet another alternative financing program. DSM allowed the Government to enter into contracts with utility companies or their subcontractors to reduce the demand for electricity. The companies helped the Government purchase services and equipment, which in turn reduced the demand on the utility's system. Both Government and utility companies benefited: the Government got money to purchase energy goods and services, and the company got a reduction in the demand on its system. With the difficulties of constructing new power plants because of rising costs and environmental concerns, DSM was increasingly becoming the preferred option because it allowed utility companies to buy demand reductions for less than the cost of new facilities.<sup>8</sup> Huntsville Division was responsible for all Army DSM negotiations with utilities where the Army is the lead agency. In September 1991 Headquarters designated Huntsville Division as the Technical Center of Expertise (TCX) for DSM, and in 1992 the Division developed a management plan, a database, and a training program. Nevertheless, no contracts had been awarded by the end of that year.<sup>9</sup>

In addition to these energy-related programs, Huntsville Division also became involved in supporting the Defense Logistics Agency's (DLA) efforts to manage fuel. The Defense Fuel Supply Center, a component of DLA, is responsible for managing bulk petroleum products, including storage and distribution, for the Department of Defense. On 13 August 1991 Huntsville Division was selected as project manager for the development of operations manuals for specified pipeline and associated facilities in the Continental United States and Alaska. Services provided by Huntsville Division included aerial surveys, emergency procedures, collection of historical data, as-built conditions, training proce-



dures, and operation and maintenance procedures. By the end of 1992 twelve Defense Fuel Supply Points had been designated, and the work was underway.<sup>10</sup>

Huntsville Division had first become involved in energy and fuel conservation during the 1970's, and for over a decade, the Division had supported programs like the Energy Engineering Analysis Program (EEAP) and the Energy Monitoring and Control Systems (EMCS) which sought to make Army facilities more energy efficient. But as interest in other projects waned, most energy programs in which the Division took part consisted of awarding service contracts that saved energy and money. Through Shared Energy Saving (SES), Third Party Contracting (TPC), and Demand Side Management (DSM), Huntsville Division was able to help reduce energy consumption in Army facilities. Likewise, despite the end of the Division's involvement in fuel conversion programs, Huntsville's role in fuel programs continued through assisting DLA in the management of fuel. Having demonstrated technical superiority in energy conservation and contracting, the Division became the Center of Expertise for several of these programs.

## **IX EFFICIENCY, MODERNIZATION, STANDARDIZATION**

Many of the programs and projects with which Huntsville Division was concerned emphasized modernization and standardization to improve the efficiency and cost-effectiveness of various facilities, systems, arms, and equipment. Since 1973, Huntsville Division had been involved in the Munitions Production Base Support Construction Program (MPBSCP), whose purpose was to modernize, upgrade, and expand munition production plants. In 1979, the Corps of Engineers assigned Huntsville Division to help the Army develop new troop and system facilities, and in 1981, the Corps named

Huntsville the Center of Competence in supporting the Army Training and Doctrine Command and the Army Forces Command with the standardization and modernization of training facilities. Subsequently, the Division has become involved in other standardization projects, most noticeably in the development of interactive computer programs which aid the Corps of Engineers or other military and government offices in the management of information and paperwork related to construction. By 1992 the Division's standardization and modernization missions included projects involving munitions factories, training ranges, troop and system facilities, the development of automated systems, and most recently, the creation of the Army Training Research Laboratory.<sup>1</sup>

Before 1988, Huntsville Division's largest mission was MPBSCP, now known as the Production Base Support Construction Program (PBSCP). The purpose of PBSCP was to improve the munitions production base of the United States. Priorities were efficiency, safety, and environmental concerns. The program involved twenty-six Army Ammunition Plants and four Arsenals and stressed automation for both safety and efficiency. Since late in 1973 Huntsville Division had been the Corps of Engineers program manager of PBSCP and also had been responsible for project design for new sites, for projects with process systems that are common to two or more sites, and for technically complex projects. The program underwent reorganization in 1990, and in 1991 funds for the program were cut significantly, affecting the number of both projects and personnel. Huntsville Division continued to provide reviews for criteria, cost concurrences, designs involving blast design and intrusion detection, and unusually complex designs, but most other tasks were transferred.<sup>2</sup>

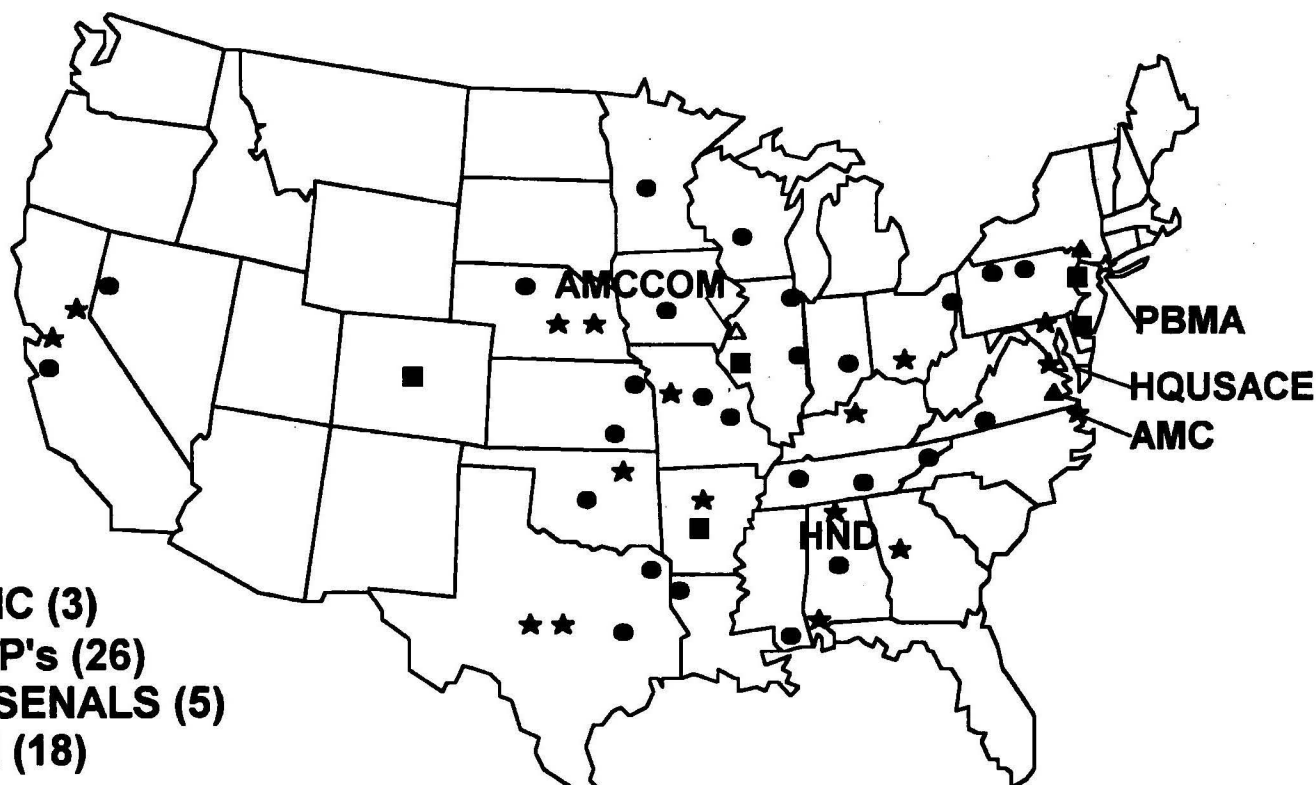
A significant PBSCP project that Huntsville Division supported involved the production of High Melt Explosive (HMX). Once a by-product of the process which produces Research Department Explosive (RDX), HMX can now be produced by a different method. RDX has approximately twice the destructive power of TNT, and HMX, which is used in missile warheads and motor propellants, has greater destructive power than RDX. Only one plant in the U.S. produced RDX/HMX—the Holston Army Ammunition Plant in Kingston, Tennessee—and in the 1980s the government decided to increase its ca-





**US Army Corps  
of Engineers**  
Huntsville Division

## **CORPS OF ENGINEERS SUPPORT TO MUNITIONS PRODUCTION BASE SUPPORT PROGRAM**



**Figure 18.** Corps of Engineers support to MPBSP, 1992.

pability. By 1990, surveys and designs for four RDX plants were underway or complete in Louisiana, Indiana, Illinois, and Iowa, and a pilot plant for HMX production had been constructed and was in operation at the Longhorn Army Ammunition Plant in Karnack, Texas. However, the program was canceled in 1990 because of funding cuts. Huntsville submitted a final review of the design with corrections and cost comparisons to the RDX process in December 1992.<sup>3</sup>

A second munitions project concerned the production of nitrocellulose, the primary component in many explosives, and again Huntsville Division was involved as part of its participation in the PBSCP. Two plants had been built to produce nitrocellulose in the 1940's, but both were obsolete by the 1980's and had been inactive for several years. The purpose of the Continuous

Nitrocellulose Modernization program was to rehabilitate and modernize those two plants so they could be reactivated to support peacetime needs and be capable of rapid mobilization. Design for both projects began in 1989, and considerable work had been done on the production plant at Radford, Virginia before the program was canceled in 1991.<sup>4</sup>

The history of a third PBSCP project, Single Base Propellant Modernization, followed a similar pattern. Two facilities had been built around 1940 to produce single base propellants, which are used in cannons and small arms ammunition. Shut down in 1945, the plants reopened during the Korean and Vietnam Wars, but only one plant at Radford actually produced single base propellants during the Vietnam War. In 1987 the project was reinitiated, and Huntsville Division prepared the



design for the rehabilitation and modernization of the production lines at those two facilities. After the Headquarters of the Corps of Engineers received the final design, the decision was made in 1990 not to fund the project.<sup>5</sup>

After 1981, Huntsville Division became involved in modernizing military training facilities through the Range and Training Lands Program (RTLTP). RTLTP existed to modernize and standardize all training ranges for the Army, the National Guard Bureau, and the Army Reserve. Huntsville Division provided technical support in standardization of designs, assisting in site planning, and development of programming documentation and equipment. In the fall of 1981 Headquarters designated Huntsville as the RTLTP Center of Competence and in September 1987 as the RTLTP Mandatory Center of Expertise. Despite severe funding problems in 1988, Huntsville Division's work was so successful that in 1990 it was designated the design agent for all Marine Corps ranges in the United States. The first range for the Marines was completed in 1989, and the program for both the Army and the Marine Corps continued through 1992.<sup>6</sup>

In addition to munitions production and range modernization, since 1978, Huntsville Division had been involved in several programs and projects related to creating standardized plans and procedures for the construction of Army facilities. Although Huntsville Division developed many standardized building plans, much of the work concerning facility standardization also involved developing criteria guidance and planning support systems or publishing and updating construction manuals.

One of Huntsville Division's early responsibilities was the standardization of construction plans and guidance support programs for military operations overseas. Since its inception in 1951, the Army Facilities Component System (AFCS), originally the Engineer Functional Components System, has become a military engineering construction support system that includes planning guidance, construction drawings, labor and equipment estimates, and computer-updated bills of materials for more than four thousand facility designs. In November 1978 Huntsville Division assumed responsibility for management and execution of AFCS. The drawings and

logistic data, designed for four different climate zones, facilitated planning and served as a guide to engineer field units. They were used by major commands and agencies in all Theaters of Operation. After the invasion of Kuwait by Iraq in August 1990, AFCS proved its usefulness during the deployment of Operations Desert Shield and Desert Storm. Those operations also showed where further system refinement was needed.<sup>7</sup>

Another construction program in which Huntsville Division participated involved the creation of standardized construction plans for military facilities in the Continental U.S. The Department of the Army Facilities Standardization Program originated after Congress directed the use of standard designs in 1982. As the Army Vice Chief of Staff explained, construction of unique facilities for each installation is not cost-effective. Under Army regulation the U.S. Army Corps of Engineers was responsible for developing standard designs for repetitive facilities, the purpose being to increase efficiency while simultaneously reducing costs. Normally, the Corps developed designs to the definitive level that delineates space allocations and functional layouts while serving as a guide for specific designs. Sometimes, however, full standard design drawings were sufficient to be used as contract documents after site adaptation. Under this program Huntsville Division developed designs for facilities as diverse as Child Development Centers, Outdoor Play Areas, and Hazardous Material Storage Facilities. Others were Fire Stations, Physical Fitness Centers, Aviation Intermediate Maintenance and Aviation Unit Maintenance facilities.<sup>8</sup>

Huntsville Division also became involved with the preparation of standardized emergency construction plans. In the event of full mobilization, standard designs for facilities to support troops and equipment being moved onto Continental U.S. Army installations became critical. Designs must be available immediately upon total mobilization to allow rapid construction of the required facilities. Emergency Drawings ("E" Drawings) had been prepared in the 1950's but by the 1980's they were obsolete. Consequently, on 12 Feb. 1981, Headquarters tasked Huntsville Division to develop a new set of standardized Mobilization or "M" Designs to replace the old "E" Drawings. The plan was to develop standard designs for all building facilities required



for total mobilization in the Continental US. By the end of FY 1989 the government had spent more than \$12 million on this project, and the first three phases were complete; final standard designs had been produced for 148 facilities. With the fourth and final phase yet to be done, in FY 1990 the Army ceased funding the program. Both designs and specifications rapidly became outdated, but no funding for updating them was anticipated.<sup>9</sup>

In the same year that Huntsville Division became involved with AFCS, 1978, the Division began to help the Corps of Engineers update and standardize engineering guide manuals for facility construction. The Corps maintained a large inventory of criteria documents. Guide specifications are used as a basis for project specification, and technical manuals provide these important criteria for the design of Army facilities. Because of changes in technology, engineering materials and equipment, construction techniques, and the design process, it is necessary to update the criteria to provide uniform guidance and requirements that have been coordinated with industry. In 1978 Huntsville Division became responsible for the maintenance and development of the Corps Criteria Documents Update Program. The program operated smoothly for many years, but funding problems appeared in 1989, and in 1992 a Process Action Team from the Headquarters of the Corps of Engineers recommended that the program be moved to Ft. Belvoir, Virginia. Headquarters did not accept the recommendation, but some changes were made in procedures, such as requiring that funds be used the same fiscal year they were received. This in turn required Huntsville Division to improve its management techniques.<sup>10</sup>

Huntsville Division also helped create an operation guide for military construction projects. In the spring of 1982 the Chief of Engineers formed a panel to investigate management of construction quality in the Corps of Engineers. This panel reported that most customer complaints focused on post-construction operation and maintenance of facilities built by the Corps. As a result of the report, the Corps ordered Huntsville Division to develop a comprehensive Operation and Maintenance (O&M) Guide applicable to virtually all military construction projects. The purpose of the program was "to insure that when a complex facility becomes operational, everything necessary for proper transition and assump-

tion of O & M responsibilities including comprehensive O & M documentation, trained personnel, and repair parts, is in place."<sup>11</sup> Included in the program would be technical manuals for equipment maintenance, including preventive maintenance, and the selection and training of necessary personnel prior to completion of construction. The initial result of the Division's work was the establishment of four phases that were to be applied to all military construction: data gathering, preparation of guidance documentation, implementation of a pilot facility, and final implementation. Originally managed by a Corps committee with members from Headquarters and the Division, on 14 February 1990 Headquarters designated Huntsville Division as the Technical Center of Expertise (TCX) for the program. Several health care facilities were selected as pilot projects, and engineers incorporated O & M guidance requirements into these and other building plans. However, due to lack of funding, the pilot program was scaled down. As of 23 Sept. 1991, the program was under review by the Headquarters of the Corps of Engineers. The expectation among Huntsville Division employees was that the program for health care facilities would be completed by the end of FY 1991, with subsequent extension of the program to all complex military construction projects.<sup>12</sup>

A program related to standardizing facility construction was Configuration Management (CM). This program enhances management capability by defining and establishing facilities criteria, designs, construction schedule baselines, and also keeping record of changes to those baselines. The resulting updated computer printouts of these criteria, designs, and schedules are distributed to all participating agencies and Corps of Engineer Districts, Divisions, and Headquarters. Originally developed for the SAFEGUARD missile program in 1968, CM has been applied to many subsequent programs associated with facility modernization and standardization, including PBSCP, Systems Engineering, and the development of Technical Data Packages. One of its most useful aspects is indication of cost growth, especially in construction phases of projects, by examining incremental changes.<sup>13</sup>

In the 1980's Huntsville Division became responsible for the development and modernization of several auto-



mated systems consisting of both computer software and hardware. The Automated Systems Branch, which did the work on these systems, is a subdivision of the Cost Engineering Division of the Division's Engineering Directorate. The Division was the assigned responsible agency for six automated systems:

**DD 1391 Processor**

- Economic Analysis System (ECONPACK)
- ENG 3086 Module
- Computer Aided Cost Engineering Systems (CACES/MACES)
- Army Criteria Tracking (ACTS)
- Life Cycle Management System.

As the responsible agency for these systems, the Division was responsible for fielding, operation, maintenance, and enhancement of the systems and for training

their users worldwide.<sup>14</sup> All six of these systems were included in the Military Construction Programming, Administration, and Execution (PAX) System, located in St. Louis, Missouri. PAX is used for many major programs, including Military Construction, Army Facilities Housing, the Commissary, the Army and Air Force Exchange Service, the Defense Logistic Agency, Medical Facilities, Navy/Marine Corps Military Construction, and Desert Shield.<sup>15</sup>

In 1980 the Corps tasked Huntsville Division as the assigned responsible agency for the DD Form 1391 Processor System. The Department of Defense uses the DD Form 1391 to give Congress requirements and justifications of funding for military construction projects. The DD Form 1391 Processor System, a PAX application, is a computer system which helps users prepare, submit, review, correct, print, and store data for the DD Form 1391. Users of the system are located not only in the United States but worldwide, including Army instal-



**Figure 19.** The 1391 Processor.



lations, major commands, the Corps of Engineers, the Army Staff, and personnel in the Office of the Secretary of Defense and the Office of Management and Budget involved in the military construction process. By 1992 the system maintained over 28,000 forms with 500 being completed and stored annually.<sup>16</sup>

PAX also included the Economic Analysis System (ECONPACK), and Huntsville Division became the assigned responsible agency for ECONPACK in 1985. As assigned responsible agency, the Division provided fielding, operation, enhancement, documentation, maintenance, and training for ECONPACK. The ECONPACK System is a software package which assists Department of the Army, Department of the Air Force, and Office of the Secretary of Defense in the preparation of Life Cycle Cost Analysis Reports. The Division fielded the personal computer version of ECONPACK in 1991.<sup>17</sup>

Closely related to the DD Form 1391 Processor was the ENG Form 3086 automated system, for which Huntsville Division was the assigned responsible agency. The Corps of Engineers uses the ENG Form 3086 to display the current working estimate of Military Construction Project costs for budget purposes. Huntsville Division developed the automated ENG Form 3086 Module, and fielded it in 1988. The mainframe ENG Form 3086 Module was located within the DD Form 1391 Processor system, which was available on the Military Construction PAX Computer System. Between 1988 and 1992 Huntsville Division developed a companion version to reside on a personal computer, and fielded Version 2.0 of PC-3086 in April 1992.<sup>18</sup>

Another automated system that Huntsville Division worked on was the Computer Aided Cost Engineering System (CACES). As assigned responsible agency for CACES, the Division operated and expanded the system, and in 1990 Huntsville Division also became the assigned responsible agency for the Micro-Computer Aided Cost Estimating System (MACES). MACES Gold is a new, enhanced microcomputer version of CACES. In 1991 the Department of Defense adopted it as the Tri-Service standard for detailed estimating. Subsequently the Department of Energy and the Environmental Protection Agency accepted it. CACES/MACES provided a standard Automatic Data Processing system that facilitated preparation of cost estimates by using

various techniques. These included standardized formats, detailed summaries for cost analysis, rapid execution of changes, monitoring cost changes, and creating and transmitting reports that comply with the Federal Acquisition Regulation requirements. The users were Corps of Engineers subordinate commands having responsibility for military construction, civil works, and hazardous and toxic waste. Huntsville Division has constantly improved and expanded the system and provided training for users of the system.<sup>19</sup>

The Army Criteria Tracking System (ACTS) is yet another computer system that functioned as part of PAX. ACTS assisted in planning facilities by providing detailed space planning factors, algorithms, and guidance on the use of category codes. Its users were Army planners and programmers at Army installations, Major Subordinate Commands, Major Commands, Corps of Engineers Headquarters, Districts, and Divisions, and HQDA personnel in the military construction process. The Installation Planning Branch, Installation Planning Division of the Office of the Assistant Chief of Engineers developed ACTS. In 1988 major revisions significantly improved the system, and in March 1989 Huntsville Division became the assigned responsible agency. Data in the system was the responsibility of the program manager, while Huntsville Division became responsible for the operation, maintenance, and enhancement of the system and for training its users. Although it contributed important criteria to plans used by the Corps, ACTS languished. The database was not updated, causing incompatibility between systems and the products produced. In October 1992 ACTS was an unfunded requirement in the Corps of Engineer's budget for FY 1993.<sup>20</sup>

In 1991, Huntsville Division implemented a new automated system, the Life Cycle Program Management Reporting System. Chemical Demilitarization projects had been the major users of Life Cycle Program Management, but in 1990 the Office of the Chief of Army Reserve (OCAR) designated Huntsville Division as the assigned responsible agency for the Army Reserve Life Cycle Management (LCM) System. In July 1992 it was officially renamed the Engineer Management Automation Army Reserve (EMAAR) System. This system was a personal computer tool for Army Reserve Engineers



to use with both major and minor construction projects. It allowed them to manage inventories from acquisition through disposal, maintain unit information, and develop required scope, documentation, and justification for projects. As assigned responsible agency, Huntsville Division was responsible for the operation, maintenance, enhancement, documentation of the software, and for training its users. The Division also was the system administrator for the OCAR electronic bulletin board used to support data transfer for LCM/EMAAR. One serious problem with the LCM/EMAAR system was delay and inefficiency caused by Huntsville Division's lack of adequate hardware, and there were also delays because of the restructuring of the Army Reserve. Nevertheless, a major rewrite of the EMAAR software was in the works in 1992.<sup>21</sup>

Huntsville Division was soon to become involved in automated systems outside of the PAX applications. Because its personnel were accustomed to complex computer software, in 1991 the Corps selected Huntsville Division to test a new automated system which had been developed elsewhere, the Corps of Engineers Financial Management System (CEFMS). This new system, a highly technical and complex program, was to address the changing organization of the Corps by largely computerizing financing and contracting. The tasking of the Division was to be effective February 1993, but the Directorate of Information Management, who was the overseer of CEFMS implementation, began training in 1992.<sup>22</sup>

A recent modernization project that Huntsville Division briefly supported was the creation of the Combat Material Research Laboratory. Following a study of existing laboratories' organization and functions, the Army's Laboratory Command (LABCOM) reported that "collocating several Army labs on a campus-like environment would improve efficiency, maximize technical capabilities, minimize administrative overhead and eliminate duplication of functions."<sup>23</sup> The consolidation would affect eighteen laboratories, including the Army Research Institute, the Ballistics Research Lab, and the Electronics Technology Devices Lab. In May 1990, Huntsville Division became the lead Major Subordinate Command in charge of proposing sites for consolidating these labs into a single facility, the Combat Materiel

Research Laboratory. The Division developed several different contracting and scheduling scenarios with specific requirements, risks, assumptions, and cost estimates for each. When it was decided that the consolidated laboratory would be located in the geographical area of the Baltimore District, the remaining work was transferred to the North Atlantic Division of the Corps of Engineers.<sup>24</sup>

Although funding for some individual programs had declined over the years, Huntsville Division remained heavily involved in modernization and standardization. The Division continued to support the Production Base Support Construction Program (PBSCP), the Range and Training Lands Program (RTLTP), and work on the several computer programs associated with the Military Construction Programming, Administration, and Execution (PAX) System. In addition to working on older programs related to standardizing military construction plans and guidance, the Division became involved in new projects like its brief support of the Combat Materiel Research Laboratory and the future work on the Corps of Engineers Financial Management System. Due to the Division performing required tasks in a timely and successful manner, Huntsville's role in modernization and standardization programs continues to grow.

## **X OTHER PROGRAMS, PROJECTS, AND ACTIVITIES**

Some programs and projects in which Huntsville Division participated appear to be unrelated to other programs; they seem to stand alone. Without exception, however, they are of great importance and require the most advanced technology. Included in this group of disparate activities are MAGLEV, support to the U.S. Army Corps of Engineers Engineer Topographic Laboratory, engineering surveys of facility deficiencies at Defense Reutilization and Marketing Service Field Activities Worldwide, Intrusion Detection Systems (IDS), engineering support to the U.S. Army Intelligence and Security Command, explosive safety and blast design,

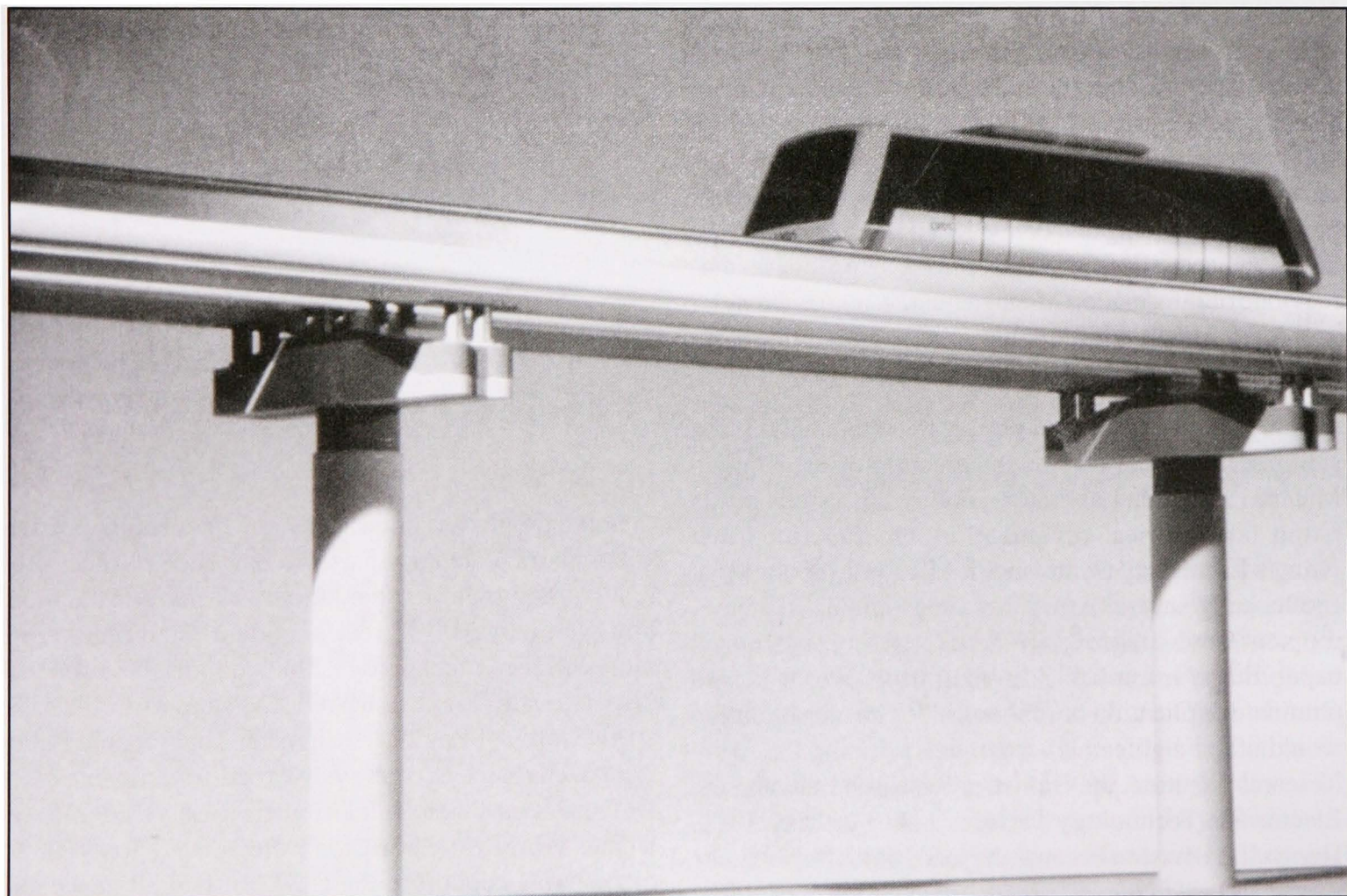


and the Federal Emergency Management Agency Key Worker Blast Shelter Program.

One of the highest profile projects Huntsville Division supported was the MAGLEV program. MAGLEV stands for “magnetically levitated,” and it refers to a transportation system which uses magnetic force to levitate, guide, and propel vehicles above a guideway at very high speed, which can exceed three hundred miles per hour. Although the U.S. pioneered the research and development in this technology in the 1960s and 1970’s, Federal research on MAGLEV terminated in 1975. Since then, Germany and Japan have constructed operational prototype systems and expect to begin commercial operation in the 1990s. MAGLEV offers the possibility of a rapid transit system that is clean, energy-efficient, and environmentally sound.<sup>1</sup>

The goal of the MAGLEV program during the 1990’s was to develop a system that would be operational in

the twenty-first century. The program would proceed in three phases. In 1990 work would focus on planning and coordination. 1991 and 1992 would be spent gathering data, including assessment of technologies, completion of market and economic studies, and development of concept designs. Following a report to Congress in March 1993 which would summarize progress to date and make a recommendation, the third phase of implementation would begin. If the recommendation were favorable, the various organizations involved in MAGLEV would complete the design, construction, operation, testing, and evaluation of a MAGLEV system prototype in eight to ten years.<sup>2</sup> In accordance with this schedule, the Corps awarded twenty-seven technology assessment contracts, totaling approximately \$4 million, in 1991 to study specific areas of MAGLEV technology. In addition, the Corps also awarded four contracts, averaging \$2 million each, to develop U.S. MAGLEV system concepts. The evaluation of this work



**Figure 20.** An artist's rendition of MAGLEV.



strongly supported the conclusion that a U.S. designed MAGLEV system would offer substantial advantages over current technologies.<sup>3</sup>

This program did not proceed at high speed, but the problems were not primarily technological. In December 1989, Headquarters tasked Huntsville Division to assume project management responsibilities for the Corps' participation in the MAGLEV program. Early in 1990, the Office of Management and Budget decided that the efforts of the Corps of Engineers, the Department of Transportation (Federal Railroad Administration), and the Department of Energy should be combined in the National MAGLEV Initiative (NMI). Other participating Federal agencies would include the Department of Commerce, the Environmental Protection Agency, the Public Health Service, the National Aeronautic and Space Administration, and other Department of Defense agencies. NMI would be jointly administered by the Secretary of Transportation and by the Assistant Secretary of the Army (Civil Works), Nancy Dorn. In December 1992, President George Bush signed the Intermodal Surface Transportation Act of 1991, which created the National Magnetic Levitation Prototype Development Program and mandated design, construction, and testing of a MAGLEV prototype within seven years from the date the bill was signed.<sup>4</sup>

Despite the signing of legislation, however, the construction of a MAGLEV prototype did not begin at this time. Although the Intermodal Surface Transportation Act authorized funds, the Bush Administration did not allocate any spending for FY 1992 or FY 1993. In November 1992, NMI had presented a preliminary recommendation to the Federal Executive Committee to proceed with a prototype development program, but the Federal Executive Committee did not reach a consensus. The position of the Secretary of Transportation was unclear, and Assistant Secretary of the Army Dorn indicated that the Army did not support proceeding immediately with a prototype program. Also, in her opinion, MAGLEV would be successful only if a single agency were responsible for it. Because MAGLEV is primarily a transportation system, Ms. Dorn believed that the Department of Transportation should be the primary responsible agency. With Congress concurring in her decision, the Administration's position was that all of the

work for NMI should be finished before going ahead with the prototype.<sup>5</sup> Pending any decision to execute the relevant legislation, the MAGLEV executive committee established a MAGLEV task force to do preliminary planning for the prototype program. "This Task Force will operate until the MAGLEV Executive Committee decides to execute the Prototype Development Program at which time the Joint Program Office, as required by the legislation, will be established."<sup>6</sup> In short, at the end of 1992 the future of the MAGLEV program and Huntsville Division's role in it were uncertain.

Another important mission for Huntsville Division was support of the U.S. Army Corps of Engineers Engineer Topographic Laboratory (ETL) at Fort Belvoir, Virginia. ETL supplies tactical topographical information and planning for Army commanders, the Joint Chiefs of Staff, and other agencies. The topographical information is based on terrain analyses and cartography of selected areas of the world which give information for evaluating the effects of terrain and man-made facilities upon Army field operations. Early in 1977 ETL requested assistance from Huntsville Division, and by the end of 1992 the Division had been involved in dozens of ETL projects. While the projects varied, each one usually required cartographic or engineering services necessary for making stable base film overlays used in various analyses. The principal subjects of these projects were surface configuration, vegetation/ground cover, key terrain, boundaries, surface water, transportation (roads, highways, railroads, airfields), built-up areas, climate, and concealment.<sup>7</sup> ETL prepared the scope of work for each project, reviewed Architect-Engineer (A-E) submittals, provided technical guidance to the A-E, performed progress reviews, and from 1990 was responsible for security. Huntsville Division selected the A-E, awarded the A-E contract, processed payment estimates, and modified the contract if required.<sup>8</sup>

This program had very few serious problems, but one problem did become acute. The A-E firms on these projects were required to have very high-level security clearances with appropriate personnel clearances. In 1990 the only two such firms were "fully loaded" with work. Huntsville Division tried to enlarge the pool of "available," but lengthy processing time for security clearances would have delayed the start of a project by



as much as two years. In 1990 ETL assumed responsibility for security, and the problem was solved as far as Huntsville Division was concerned.<sup>9</sup> Thereafter, Huntsville Division's participation in these projects proceeded smoothly until lack of funds caused drastic cuts in the program in 1991.<sup>10</sup>

Huntsville Division's work on engineering surveys for Defense Reutilization and Marketing Services (DRMS) was also an significant mission. This work was unrelated to the environmental support for DRMS which the Division provided. DRMS operates many Defense Reutilization and Marketing Offices (DRMOs), most of which are rented from military installations of other commands. The DRMS funds maintenance and repairs at these leased facilities and all new construction at DRMOs; however, the DRMS engineering staff is too small to prepare the programming documents in-house. Consequently, in May 1988, the DRMS asked Huntsville Division to develop new construction projects and information on its backlog of maintenance and repair, and also to correct deficiencies at DRMO facilities worldwide. The final products would be facility inspection reports and DD Form 1391 programming documents.<sup>11</sup>

For this program, Huntsville Division managed four Architect-Engineer (A-E) contracts covering 208 sites in five regions. Two of the regions were outside the Continental U.S., and three were inside the Continental U.S. One A-E contractor had two Continental U.S. regions. A-E work included on-site inspections, submission of facility inspection reports, and preparation of DD Form 1391 programming documents. Huntsville Division was responsible for the technical review for all Continental U.S. sites and oversaw the technical review support furnished by the Corps of Engineers Europe and Pacific Ocean Divisions.<sup>12</sup>

The DRMS program was soon beset by irritating problems, most of them involving time. Priorities changed and would continue to do so. A problem that could be corrected by a minor repair immediately might require major repairs later if neglect continued. Also, a perceived deficiency now might be irrelevant in the future because of changes in operational requirements.<sup>13</sup>

One problem was project delays, which became quite

expensive. Required maintenance and repair exceeded what was estimated for each project, but Huntsville Division succeeded in negotiating adjustments in the contracts. Other efforts were not so successful. The DRMS Region Offices were so slow to review site inspection reports and draft DD 1391s and to select deficiencies for corrective action that time extensions were necessary for all contracts. When A-E contractors refused "no cost" time extensions, the DRMS and its Region Offices agreed to provide comments on a minimum of ten DD 1391s per week until the end of November 1989; comments received after that date would not be forwarded to the A-E contractor.<sup>14</sup> The contractors themselves were not without blame for delays. The A-E contractor for the Memphis Region was required to re-submit ten draft DD Forms 1391, because the first drafts were inadequate. Performance improved, but completion of that contract was delayed also.<sup>15</sup>

A second problem with DRMS work was an apparent misunderstanding of the terms of the A-E contracts, which may have been related to delays. The principal reviewer at DRMS Headquarters had not been involved in developing the scope of work and consequently made requests for data (detailed floor-plan drawings, economic comparisons, etc.) beyond what was required by the contracts. Some comments on the DD Form 1391s went beyond the A-E's scope of work and had to be withdrawn.<sup>16</sup>

These problems had been dealt with satisfactorily when serious funding problems arose. The intention had been to develop a computerized data base of all the facility deficiencies identified under these contracts, but funding was inadequate for that plan. The solution was a contract modification that allowed the A-Es to obtain floppy disks of the final DD 1391s and of the List of Deficiencies. This program ended in FY 1990.<sup>17</sup>

During this time period, Huntsville Division was involved in two major projects related to the development of security systems. The first of these was the Intrusion Detection System (IDS), a state-of-the-art electronic security operation. In 1981, the Defense Nuclear Agency asked Huntsville to design a facility with intrusion detection capability. Then in 1982, the Division became responsible for the Army's IDS program. The Division's participation in IDS had two aspects: it was both the



Mandatory Center of Expertise (MCX) and the Design Center. It received those designations in December 1983, and its obligations were further defined by the IDS Program Management Plan, issued in 1984 and revised in 1987. Customers for the IDS program were all major commands, installations, and Corps of Engineer divisions and districts. As MCX, Huntsville Division developed criteria for designs, construction, procurement, and post-construction evaluation of IDS. As a result of a Memorandum of Agreement with the Army Material Center Product Manager—Physical Security Equipment, an agency which is responsible for physical security throughout the Army, Huntsville Division performed site surveys and provided engineering support for the development and deployment of the Integrated Commercial Intrusion Detection System (ICIDS) at Army installations worldwide. It also assisted the Protective Design MCX in Omaha, Nebraska with the IDS parts of their projects, and in September 1990 Huntsville Division conducted the first IDS Design Course. As the Design Center for IDS, Huntsville Division was capable (if requested) of designing major IDS projects—from site survey through completed design package and procurement. More frequently, however, Huntsville Division did the design work, and the appropriate district was responsible for construction. Technical problems, such as a defective video camera system or deficient perimeter lighting, were rather easy to solve. More difficult to deal with were the moratorium on Military Construction, Army in 1991, a labor dispute in 1992 at the Unisys Corporation, and perennial under-funding.<sup>18</sup>

A more recent project that had a security aspect was Huntsville Division's support of the U.S. Army Intelligence and Security Command (INSCOM). In December 1989 INSCOM Headquarters, at Fort Belvoir, Virginia, requested Huntsville Division's assistance with upgrading INSCOM facilities worldwide. The program had three aspects: developing physical security systems similar to IDS, protecting utilities through power reliability enhancement, and developing A-E designs. As Technical Manager for the program, Huntsville Division was responsible for developing project criteria, reviewing submittals, and monitoring design progress. It also assisted INSCOM with project identification and provided contract administration, including procurement services. Huntsville Division's experience in contract-

ing and its technical expertise, especially in electrical and electronic technology, were very important in this program. There were no significant problems.<sup>19</sup>

One activity which Huntsville Division supported that affects many programs and projects was explosive safety and blast design. The Division's first mission in this area was to design and construct the first U.S. Ballistic Missile Defense system, including the design of facilities to resist the effects of nuclear and conventional explosions. As a result of that and subsequent experiences, Huntsville Division (especially the Structures Branch) developed valuable expertise in assuring the safety of facilities and personnel from various types of shock including seismic forces as well as both nuclear and conventional explosions. Capability to predict airblast, fragmentation, ground shock, and dynamic analysis of complex structures was a requirement. The Division supported more than a dozen ongoing major projects, and its involvement and high visibility in such projects resulted in numerous unsolicited requests for service from both the Army and the Air Force. Most of these projects involved the design of hardened facilities and analysis and risk assessment from explosions, both deliberate and accidental, including prediction of airblast.<sup>20</sup> Among the types of explosive safety and blast design projects with which Huntsville Division became involved are munitions production facilities, NASA test facilities, Ballistic Missile Defense/Strategic Defense Command launch facilities, Army/NASA rocket propellant manufacturing, ammunition and missile storage facilities, chemical weapons demilitarization, conventional demilitarization, including ordnance removal, and investigation of accidents.<sup>21</sup>

One other highly technical program in which Huntsville participated involved the Federal Emergency Management Agency (FEMA). FEMA develops programs of national civil defense preparedness for coping with crises, including one involving nuclear attack. One aspect of these programs is protection of industrial production, particularly those industries necessary for national defense and for supplying the critical needs of the population. Not only must industrial equipment in these industries be protected, but also it is necessary to protect the key workers who operate these industries. Thus, in April 1982, FEMA requested that the Corps of Engi-

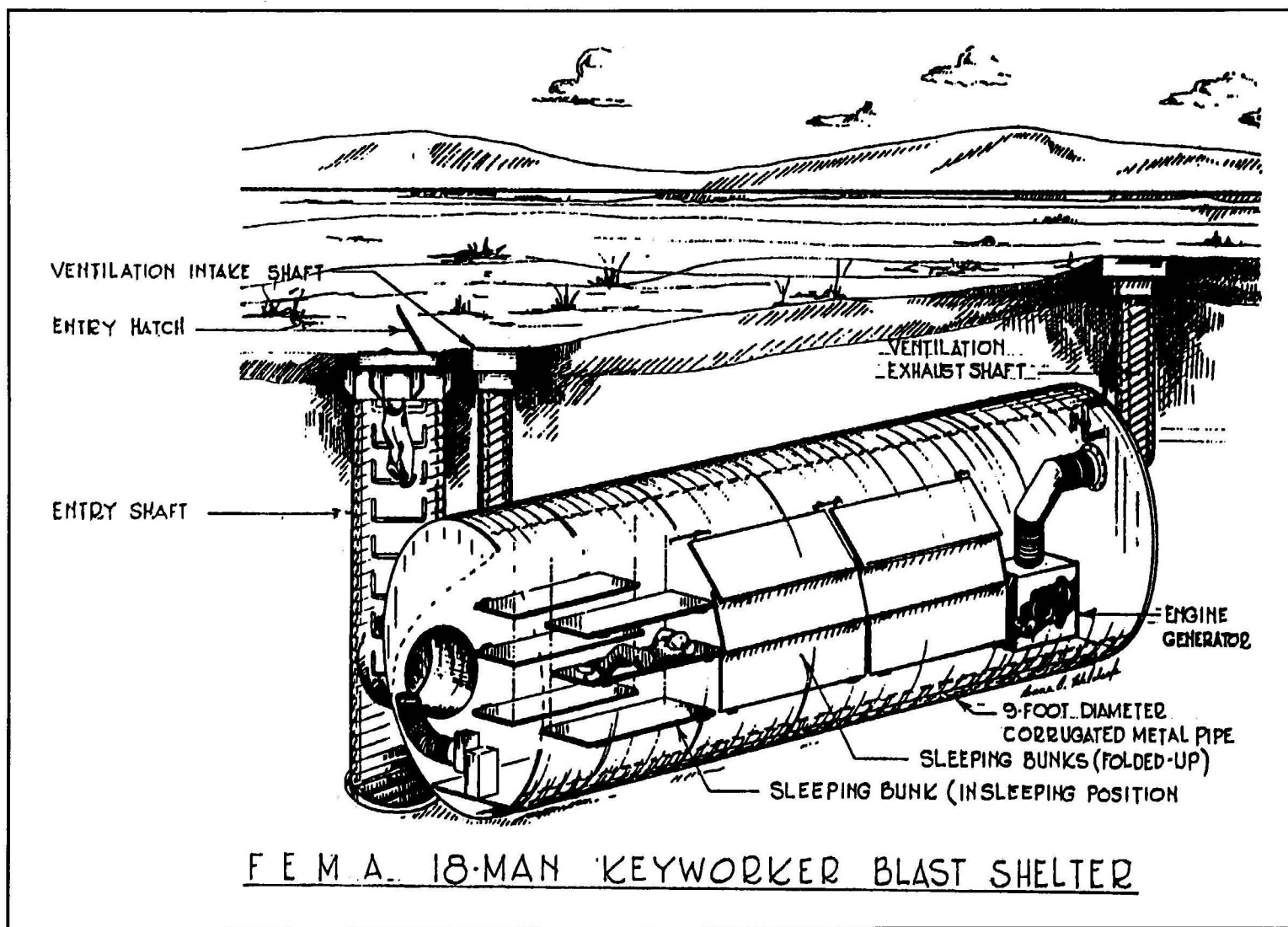


neers support the Key Worker Blast Shelter Program, and Huntsville Division became involved in the program immediately.<sup>22</sup>

FEMA's original intention was for Huntsville Division to develop a standard design for prototype deployment of three dedicated shelters for one hundred people and three expedient shelters for twenty people. Huntsville Division would be involved in design, construction, analysis of cost effectiveness, testing and evaluation, and development of construction management plans to facilitate rapid deployment of the shelter program. An Interagency Agreement dated 30 July 1982 was modified seven times by 1986, and these modifications greatly increased The Division's participation in the program. The range of the size of the shelters also increased. Some were large enough for one thousand people, and others were just adequate for fifteen people.<sup>23</sup>

For the most part, the FEMA program proceeded smoothly. A complete design package included mylar drawings, specifications, and cost estimates, and most of the packages were sent to FEMA in 1988 and 1989. Toward the end of 1989, however, it appeared that funding would be inadequate to complete a final project, cost estimates for two types of small shelters. The problem was resolved, however, and the project was completed to the customer's satisfaction by 1990.<sup>24</sup>

Work for MAGLEV, support of the Engineer Topographic Laboratory (ETL), DRMS engineering surveys, Intrusion Detection System (IDS), engineering support of the Intelligence and Security Command (INSCOM), explosive safety and blast design, and the Federal Emergency Management Agency's Key Worker Blast Shelter Program are unrelated and separate in terms of fund-



**Figure 21.** FEMA's Key Worker Blast Shelter, 18-man.



ing and origin, but they have one thing in common: they were all highly complex programs that required technical expertise. Since Huntsville Division had demonstrated proficiency in areas related to these programs, many agencies called on the Division to perform the complex tasks involved in these projects. As far as funding allowed, Huntsville Division successfully completed all of these tasks to the customer's satisfaction.

## **XI. TRAINING AND EDUCATION**

Even considering the amazing diversity of Huntsville Division's activities, the extent of its involvement with training and education is still surprising. The beneficiaries of its expertise range from pre-schoolers to mature experts with high academic degrees. The Division became involved in two areas of education: the bulk of its activities involved providing professional training for military personnel and civilian employees in the Corps of Engineers or the rest of the military, but the Division also participated in educational programs with public schools and local universities.

Huntsville Division's professional training included in-house courses for Division employees and also Corps or military training programs. Perhaps the most successful of the in-house training programs was the Leadership-Management Intern Program. In the late 1980's, the Department of Defense in general and the Army in particular began to emphasize leadership- management training for career civilian personnel and their integration into the Total Army team. The demands of advancing technology necessitated highly skilled professional and technical personnel in executive positions, which inevitably would lead to the "civilianization" of many high level managerial positions. Both technical and management-leadership training were deemed essential to ensure readiness and continuity of operations. A Special Task Force on Civilian Leader Development at the Training and Doctrine Command (TRADOC) headquarters in Fort Monroe, Virginia, developed guidelines over a three-year period which appeared as a series of recommendations in the Civilian Leader Development Plan. TRADOC had decided that it would be more practical

to give leadership training to the technicians than it would be to give technical education to the management personnel. One manifestation at Huntsville Division of this new emphasis on civilian training was the institution of the Leadership-Management Intern (LMI) Program.<sup>1</sup>

Colonel Philip L. Hall, Huntsville Division's new commander in the summer of 1990, had experience with a "Management Intern" program at the Corps of Engineers Seattle District. When he met with Huntsville Division leaders in a "Transition Seminar" July 10 and 11, he discussed that experience with them. After further discussion, the group recommended the establishment of a leadership development program modeled after the Seattle District's program. This would facilitate training and guidance on leadership and management for a specific number of employees every year; thus, the LMI program was established.<sup>2</sup>

LMI was a part-time, year-long program, the goal of which was to develop a pool of highly-trained leaders and managers for the future. The program included analysis of leadership style, guided preparation of an individual development plan, university classes, visits to field sites, staff meeting participation, briefings by the commander, and mentoring relationship with a senior manager.<sup>3</sup> The LMI participants, while carrying on their regular duties, also attended classes, briefings, and meetings, took field trips, and worked on various projects. One of their assignments was to formulate a mission statement for Huntsville Division. As they articulated it: "we provide quality, highly diverse, technically specialized engineering design, planning, management, contract and training services to Government agencies worldwide. We respond to customer needs in a timely, cost-effective manner while providing a caring work environment that nurtures excellence." <sup>4</sup> It was this group which also proposed the formation of an Educational Committee for Huntsville Division.<sup>5</sup>

Interaction with leaders and managers of the Huntsville Division gave the participants a better understanding of various leadership styles, and field trips increased their understanding of the total mission of the Corps of Engineers. The field trips included visits to the Advanced Solid Rocket Motor facility in Iuka, Mississippi (where they learned about Huntsville Division's work with NASA), the Nashville District (to study a civil works



district), Washington, D.C. (to visit Corps headquarters, the Pentagon, the Transatlantic Division, Army Materiel Command Headquarters, Senator Richard Shelby's office, and the White House), and Vicksburg (to visit laboratories at the Waterways Experiment Station, the Lower Mississippi Valley Division, and a civil war battlefield).<sup>6</sup>

This first class of the LMI program began in April 1991 and ended in March 1992. In its first year, 1991-1992, forty Huntsville Division employees applied, and twelve were selected. The participation of one was delayed because of his temporary assignment elsewhere. The second LMI class began in April 1992 and ended in March 1993. The original intention had been to select only ten participants, but enthusiasm was so high that again twelve participants were chosen.<sup>7</sup> Undoubtedly LMI increased the participants' knowledge and skills while preparing them for managerial positions. Because participants remained in their same positions, however, they had little opportunity to use their improved abilities. Significant benefits of the program to both the Corps and the individuals were more potential than immediate.

Other types of in-house training were more narrowly focused than LMI. A good example is the two-day media training seminar sponsored by the Public Affairs Office to help Huntsville Division personnel working in environmental programs. These individuals sometimes found themselves in situations where they must talk with the media, even though that was not part of their official job description, and the course was intended to prepare them to deal with those situations. A well-known media trainer from the Information Management Directorate of Corps Headquarters came to Huntsville to teach the course the first time it was offered in 1989. With the help of a local media person, the Public Affairs Office conducted two one-day courses in 1992. Among other in-house training offered were seminars held on a variety of topics by Personnel Services, the Federal Women's Program, and the Black Employee Program.<sup>8</sup>

Huntsville Division was also involved in several training missions for the benefit of military personnel outside of the Division. Since 1978 the Training Directorate at Huntsville Division has managed the Corps of Engineers' training program for the Corps' workforce

and has trained personnel in the U.S. Army, the U.S. Air Force, the U.S. Navy, and other agencies.<sup>9</sup> By January 1992, the Corps of Engineers Directorate of Training Management included five divisions:

- Training and Operations Division—conducted traditional classes
- Nontraditional Training and Planning Division—developed video-based instruction
- Corps of Engineers Registration—acted as registrar for all training courses
- Training Assistance Division—provided logistics (course materials, scheduling, etc.)
- Environmental Training Management Division—coordinated environmental training for the entire army (civilian and military).<sup>10</sup>

The Training Directorate's mission statement was long and complex, because it had numerous responsibilities. It served as the Center for Proponent Sponsored Engineer Corps Training (PROSPECT), and as an Environmental Training Support Center, which maintained a comprehensive environmental training resource center, conducted assessments of environmental training needs, incorporated environmental training into required courses, and published the "Directory of Environmental Training Courses" as prescribed by the Army Environmental Training Master Plan (AETMP). The Training Directorate planned, developed, directed, and assured quality for both classroom and exportable training to maintain technical knowledge required for competent performance. It provided technology transfers, increased technical knowledge for professional growth, taught new techniques and skills, oriented new employees, provided cross training to aid in multi-disciplinary technical communication, and provided mobilization training. It also ensured all training materials are developed in accordance with the Corps of Engineers System Approach to Training (COESAT), and served as the Corps Headquarters registrar for PROSPECT and other Department of Defense training programs.<sup>11</sup>

Essentially, all of the Division's training operations before 1991 can be divided into two groups: the Proponent Sponsored Engineer Corps Training (PROSPECT)



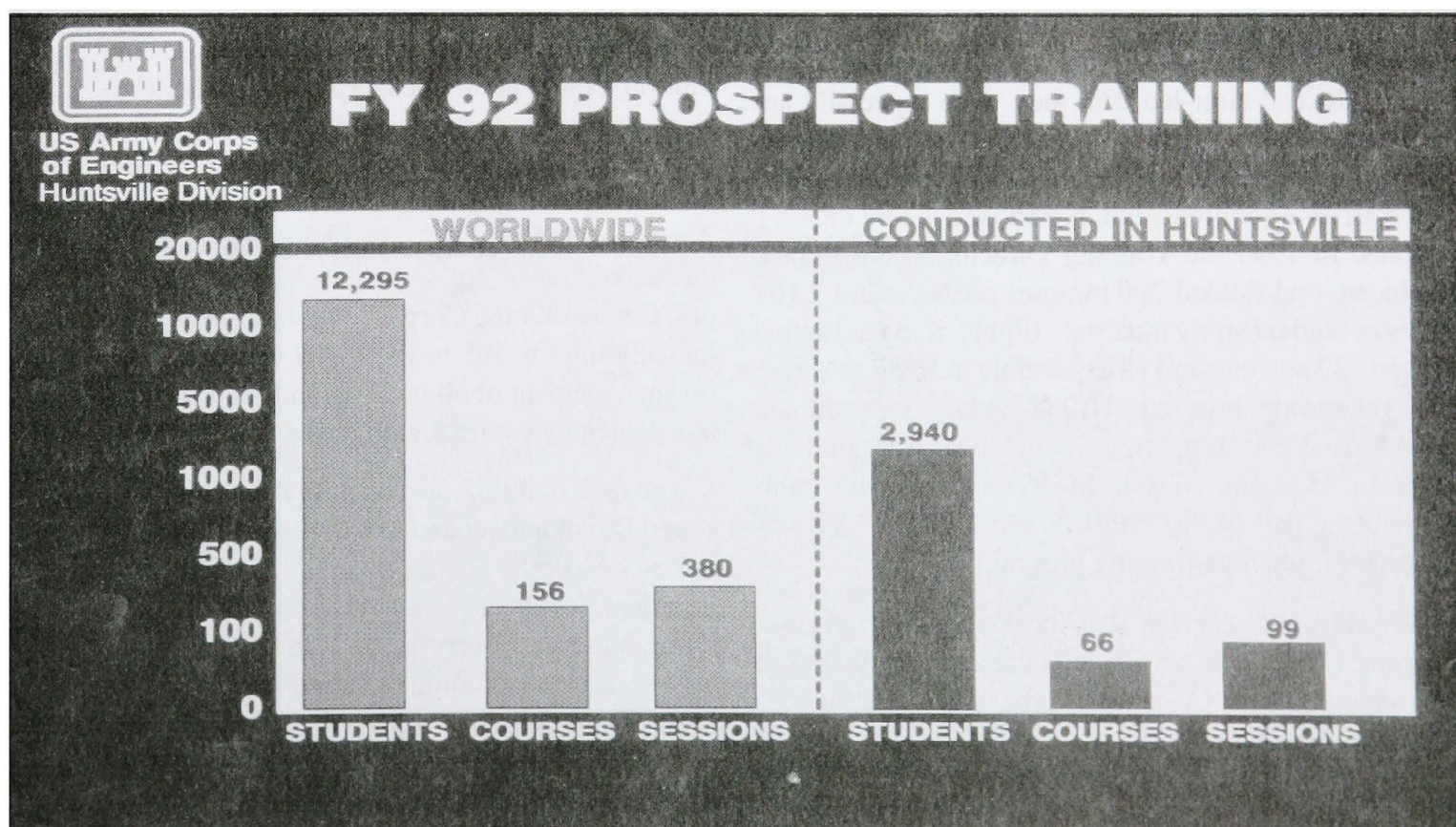
Program and the Corps of Engineers Nontraditional Systems Training (CONTRAST) Exportable Training Program. PROSPECT consisted of all classroom training, including technical courses, commander's courses, and environmental training. CONTRAST included all non-traditional courses, primarily video-based, facilitator led instruction.<sup>12</sup>

Most of the training Huntsville Division offered was proponent sponsored. The Training Directorate administered and coordinated more than two hundred short courses as part of PROSPECT, most lasting less than five days. All these courses were job-related and necessary. Some were taught by Corps of Engineers personnel and others by instructors under contract. They were taught in classrooms at the Bevill Center in Huntsville and at other locations worldwide. In 1991 the PROSPECT training program involved 12,768 students in 164 classroom courses worldwide. These figures included 2,678 students in 56 courses in Huntsville. Of the 12,768 students, 9,526 were Corps of Engineers employees, and 3,242 came from other agencies.<sup>13</sup> Growth continued in 1992. Sessions conducted totaled 433, of which 358

were classroom and 75 onsite. Of 14,288 students, 78 percent were Corps of Engineers employees, and 22 percent were from other agencies. Corps personnel receiving training in the Department of Defense Schools Training Program totaled 1,473. There were 156 courses worldwide, including 66 courses for 2,940 students in Huntsville (see Figure 22).<sup>14</sup>

As part of PROSPECT, the Training Directorate managed classroom courses taught at the Bevill Center specifically for the Corps of Engineers, one being the Corps' Commander's Course. This was an intensive orientation course for future commanders of the U.S. Army Corps of Engineers districts and divisions. After a week or more elsewhere, the future commanders spent four weeks in Huntsville, where the emphasis of their studies was on contracting, with two full weeks being spent on government contract law. The course culminated with a one-week training session in Washington, DC, where the future commanders heard from principals at Headquarters.<sup>15</sup>

Also included in PROSPECT was the Training



**Figure 22.** FY 92 PROSPECT Training (Projected).



Directorate's management of environmental training for the military. The environmental training begun by the Directorate in 1990 caused Huntsville Division to become recognized as an Army Environmental Training Support Center (ETSC). The Hazardous and Toxic Waste courses program grew from 800 students in 1989 to 1,100 students in 1990; it trained 1,828 students in 1991.<sup>16</sup> On July 1, 1991, the Environmental Training Management Division was established with the primary responsibility of managing assigned tasks pertaining to the Army Environmental Training Master Plan (AETMP). It would analyze training needs, develop and maintain an environmental training directory, be the point of contact for other agencies for the availability of environmental training courses, and identify available experts on environmental subject matter. As a result of surveying all possible sources, the division received many course descriptions, brochures, and catalogs on environmental training at other institutions, and these would be made available through a training materials resource center.<sup>17</sup>

The other type of training that the Training Directorate managed was the Corps of Engineers Nontraditional Systems Training (CONTRAST) Exportable Training Program. These courses were less expensive, because they were available at the work site. They were video-based and facilitator-led, and they were especially appropriate for small groups. Although they were available to and intended for the Corps of Engineers, many non-Corps agencies also purchased CONTRAST courses. In 1990 the Training Directorate developed, produced, and fielded 790 minutes of video and 2,101 pages of student study material. Eighty-five facilitators trained 732 students in 118 exportable training sessions. In the classroom program, 11,985 students were trained in 411 sessions; these figures include 1,137 students trained in 55 sessions onsite. In 1991 all exportable training became part of PROSPECT, and CONTRAST was no longer a separate training program.<sup>18</sup>

An additional service that the Huntsville Division Training Directorate performed during this time was to provide the Kuwait Government an opportunity for construction management training. In 1990, at the request of the Headquarters of the Corps of Engineers, Emergency Management, the directorate briefed representatives of the Kuwait Government on the ability of the

Directorate of Corps of Engineers Training Management to support the Kuwait Government's training needs regarding construction management and quality verification. The directorate offered to train Kuwait personnel either in Kuwait as a group, or individually in the states. Although no training actually took place, this is another example of the worldwide services that the Training Directorate provided.<sup>19</sup>

One reason for the great success of the Training Directorate was the improvement in its facility. The old Corps of Engineers Training Center had been a leased building on North Memorial Parkway near downtown Huntsville. It was too small for current needs, and it would be completely inadequate for future requirements. Memorial Parkway is a main artery in Huntsville, and heavy traffic made it dangerous for students to cross the road from their quarters to their classrooms. Also, the distance from Huntsville Division's headquarters was inconvenient.<sup>20</sup> The obvious solution was a facility nearer to the Division.

The possibility of building a new facility arose when the University of Alabama in Huntsville (UAH) offered "Build to Lease" facilities on its campus, and in 1982 a decision was made to accept the offer. Using a \$9.5 million federal grant, the Corps of Engineers would design, construct, and furnish a new training facility on land belonging to UAH. According to the Memorandum of Understanding between the Department of the Army and UAH, the Corps of Engineers would share the use of the facility with the UAH Continuing Education Center, but the Corps would have priority in use of the building for fifty years. UAH would be responsible for management of all housing and food service, which it arranged by contract with the Marriott Corporation.<sup>21</sup>

The new building, the Tom Bevill Center for Professional Development and Continuing Education, opened in January 1988. It was close to Huntsville Division's headquarters office, which provided administrative support, and it was even closer to many facilities on the UAH campus, including the library and physical fitness areas. The Bevill Center provided complimentary transportation to the airport ten miles away and to points of interest in Huntsville. Almost 93,000 square feet in size, it included a reception area, administrative offices, state-of-the-art classrooms, equipment, and conference rooms,



a one-hundred-room hotel, and a restaurant. Under its procurement package, the Corps was responsible for all furniture, furnishings, and interior design for the entire facility. This unusual cooperative venture between federal and state agencies provided an admirable example of a functional facility that was both cost-effective and aesthetically pleasing.<sup>22</sup>

The Bevill Center was a success from the beginning of its existence. It provided a safe, convenient, attractive setting for the learning experience. The Memorandum of Agreement specified that this would be a non-profit operation, so high occupancy kept the hotel's room rates low. The facility's good reputation spread quickly and widely, and its use became increasingly popular.<sup>23</sup>

By 1992 the Corps' use of the building had increased to the point that space available was inadequate. The UAH Continuing Education Department vacated the

Bevill Center in January 1992, so the Training Directorate could expand its facilities. Between February and May 1992 a major remodeling increased the size of the facility by more than four thousand square feet, including increased office space, conference rooms, and training labs. New furniture and furnishings were included in the renovation, but the most spectacular improvement was a new computer lab. This lab was over one thousand square feet and contained not only advanced computer technology but also such conveniences as indirect lighting, flat wiring for the terminals, and recessed monitors to provide more desk space.<sup>24</sup>

Huntsville Division's activities with public and higher education were as varied as its involvement in military training. These activities included science fairs, introductory courses to raise interest in engineering, and also student internships. Although these activities were not as technical as the other courses and training, they were



**Figure 23.** The Bevill Center.



highly visible to the public and had the beneficial side effect of improving the Corps' public image through community involvement.

One of the services Huntsville Division personnel provided was donating time to judge public school science fairs. The Huntsville City and Madison County schools hold an annual science fair at which students from kindergarten through eighth grade submit projects in competition, and for some years Huntsville Division personnel had been among the judges. In 1992, however, the Huntsville Chamber of Commerce asked Huntsville Division to provide all the judges. Thirty-five volunteers responded from Chemical Demilitarization, Programs and Project Management, Engineering, and Special Projects; they also had some assistance from the Mobile District Corps Office and Redstone Arsenal. That year there were hundreds of entries, and it would be difficult to determine who was more enthusiastic about the program—the students or the judges.<sup>25</sup>

Also in 1992, Huntsville Division established a seven-person Education Committee, whose major responsibilities were to provide judges for such fairs, provide speakers to area high schools, and to implement the Introduction to Engineering Program, a series of briefings provided to interested high school students during spring break.<sup>26</sup> The latter was a new and popular program originating in 1992. Five local high school students participated in the Introduction to Engineering Program during their spring break from 30 March through 3 April 1992. The program provided information about careers in engineering in both the government and private sectors, including actual duties at work, and relevant college courses. A field trip to Redstone Arsenal was a break in the week of briefings. This original project was so successful that it was repeated, with some changes, the following year, and the intention was to make it an annual event.<sup>27</sup>

Huntsville Division also worked with local university students by giving them part-time work. In 1989 the Division made an agreement with Alabama Agricultural and Mechanical University in Huntsville, under the "Adopt-a-School" Program, to employ one of its students in a technical area to assist technical and professional personnel. The university would refer to the position as an internship. It was expected that the arrange-

ment would benefit the students, the university, and the Corps.<sup>28</sup>

Many different directorates and branches of Huntsville Division were involved in these community education activities, especially in providing judges for the science fairs and speakers. The Education Committee, composed of members of various directorates, implemented the Introduction to Engineering Program, which was an outgrowth of the Leadership-Management Internship Program. The Training Directorate and the Equal Employment Opportunity Office took the initiative in the project with Alabama Agricultural and Mechanical University.

The training and educational activities of Huntsville Division were varied and widespread. The Division introduced many training courses designed to improve leadership or help employees deal with the public. Simultaneously, the Division's Training Directorate managed courses, both traditional and non-traditional, that involving the Corps of Engineers, the Army, and other branches of the military. Perhaps the most important function in this regard was the Directorate's role as Environmental Training Support Center. However, the extent of Huntsville Division's participation was not limited to military training. The Division also became involved in judging science fairs, introducing high school students to engineering, and providing internships for a local university. Through such activities, the Division not only added to the preparedness of the military through improved employee performance, but also contributed to the Huntsville community.

## **XII SIGNIFICANT EVENTS**

The period from 1988 to 1992 was a momentous time for Huntsville Division, and many important events occurred beyond the day to day work of Division employees. The Persian Gulf War, which began in early 1991, was perhaps the most important. As the largest operation involving U.S. personnel since the Vietnam War, it



provided both a personal challenge to the abilities and commitment of Division personnel and a testing ground for many new Corps of Engineer programs. Also during these years, there were several natural disasters to which Huntsville Division reacted with physical and financial aid, not least being the tornado that left a path of destruction across Huntsville in 1989. Lastly, there was the reorganization of the Corps of Engineers and Huntsville Division which sparked numerous activities to help ease the transition to new operations and functions in a new era. Despite the confusion Huntsville Division experienced during reorganization, employees reacted to the events of this period with patriotism and professionalism.

One of the most important events in which Huntsville Division became involved was the Persian Gulf War. The Division supported all phases of the war, including Operations DESERT SHIELD and DESERT STORM and the Kuwait Emergency Recovery Office (KERO). Iraq's invasion of Kuwait on 2 August 1990 precipitated deployment of military forces from the United States and other nations to Saudi Arabia and other parts of the Persian Gulf region to prevent further aggression by Iraq; this operation was termed DESERT SHIELD. DESERT STORM, a military offensive against Iraq, began on 16 January 1991 and continued until Kuwait had been rescued and offensive operations were suspended 27 February. Thereafter, the Kuwait recovery operation commenced. Throughout the war, Division employees followed events closely, and the Public Affairs Office even published the weekly Desert Storm Update to keep the Division informed of the U.S. military effort.<sup>1</sup>

For some at Huntsville Division, the war was a personal challenge. Many Division employees and members of their families served in DESERT SHIELD or DESERT STORM or both.<sup>2</sup> Some were in military positions, but there were also many civilians. In the 1980s "civilianization" was a trend in the Department of Defense. More than twenty thousand military spaces were converted to civilian positions because civilians were cheaper. Their benefits and allowances differed from those of the military, and since the usual rotation of military personnel necessitated constant retraining, non-rotating civilians promoted continuity and gained exper-

tise based on years of experience working with intricate, sophisticated equipment. Civilians, many of them contractors, were from 2 to 5 percent of the total U.S. forces in Saudi Arabia. Although some were with the Air Force and the Navy, more were with the Army, especially the Army Materiel Command. They were especially concentrated in engineering, logistics, communications, real estate, contract administration, and the maintenance and repair of equipment.<sup>3</sup>

Several Huntsville Division employees also served during the post-war recovery efforts. One military and eight civilian employees of Huntsville Division went to Kuwait to serve in the Kuwait Emergency Recovery Office (KERO), where their main activity was letting and administering about \$200 million worth of firm fixed price contracts. Virtually all those contracts were for cleanup, renovation, and construction of roads, the defense establishment, public buildings, schools, electrical power, and water distribution systems.<sup>4</sup>

Those individuals who served or whose friends and family members served faced extraordinarily trying circumstances, but in a different way the Persian Gulf War was a trial for all of Huntsville Division. The war was a test of many new U.S. military developments such as tanks and missile systems that faced combat for the first time. Less well known, but equally important, was the testing of the Army Facilities Components System (AFCS), which Huntsville Division maintained and updated. AFCS was a database that included designs for more than four thousand standardized Army facilities which could be built in any theater of operations (desert, tropical, frigid, or temperate) and had all the data necessary to order materials and begin construction. This information was available in Army Technical Manuals, AFCS documents, or on magnetic tape and diskettes. There were four basic AFCS Technical Manuals. TM 5-301 described installations and facilities categorized by climate. It gave detailed information on standards of construction, cost, shipping weight of materials, and construction work hours required. TM 5-302 included site plans, utility plans, and facility construction drawings that were accessible by computers with computer-aided design and drafting equipment. TM 5-303 gave complete bills of materials for all facilities. The User's Manual, TM 5-304, explained the AFCS system and gave



instructions for using the manuals for construction planning and execution.<sup>5</sup>

The Gulf War proved that AFCS was an outstanding success under actual war conditions as well as in the post-war period. Their primary users were combat engineers (especially the 412th and 416th Engineering Commands and subordinate units), but the AFCS also was used by the Joint Chiefs of Staff, major Army commands, the U.S. Navy, Air Force, and Marine Corps. The data was especially important for building hospitals and helicopter air fields and also for adding chemical and biological protection to existing and future designs. The fact that the entire database was instantly available to field engineers at the push of a button made them valuable engineering resources which speeded the construction of these vital facilities.<sup>6</sup>

The Gulf War also tested Huntsville Division's contracting and procurement capabilities. Huntsville's Medical Acquisitions Division, with its extensive experience in contracting, awarded about \$6 million worth of contracts to U.S. contractors for miscellaneous support equipment. The most important items were medical oxygen generation and distribution systems and computerized Tomography (CT) systems.<sup>7</sup>

Other major events in which Huntsville Division, along with other Corps of Engineers organizations, had a role were natural disasters. Although Huntsville Division had no geographic responsibilities, Division personnel nonetheless became involved in three natural disasters between 1988 and 1992. The first of these was Hurricane Hugo. After devastating Montserrat and St. Croix in the Caribbean, Hurricane Hugo ravaged Charleston, South Carolina, and the surrounding countryside on 22 September 1989. The city had not suffered such damage since the hurricane and earthquake of the 1880s. Some Huntsville employees went to South Carolina to help in the recovery operation, and many others donated money to the relief effort for the South Atlantic Division.<sup>8</sup>

Another storm came closer to home. At 1637 hours on 15 November 1989 a tornado struck the southeastern section of Huntsville. At the height of rush hour the tornado touched down west of Memorial Parkway and traveled eastward along Airport Road, two major traffic

arteries, then moved over Garth Mountain into Jones Valley. Vehicles along that route were thrown off the roads and overturned, and nearly every building was leveled. The death toll eventually reached more than twenty; 119 homes were destroyed, and many more homes, businesses, churches, schools, and vehicles were severely damaged. Estimates of the damage exceeded \$250 million, and President George Bush declared the section a federal disaster area.<sup>9</sup>

Huntsville Division personnel were personally involved in the disaster. One Division employee survived the destruction of a building in which two other people were killed, then worked for hours to rescue survivors buried under debris. Other Huntsville Division employ-



**Figure 24.** Tornado debris in Huntsville, 1989.



ees suffered property losses. They, with other volunteers, soldiers, medical personnel, and Huntsville police worked through the night and for days thereafter clearing rubble and searching for dead and injured. They donated time, money, blood, food, and clothing. One directed traffic during the emergency; others distributed food and clothing. Another assisted with structural evaluations. Debris removal and clean-up went on for weeks before reconstruction could begin.<sup>10</sup>

In this type of emergency Huntsville Division operates within the geographic boundaries of the Nashville District of the Corps of Engineers. However, by 16 November the Public Affairs experts of Huntsville Division were functioning as part of the Emergency Operations team. They were especially concerned with making a photographic record (both still and video) of the devastation so Nashville could let Headquarters know what was going on. It would be difficult to say which was more impressive, the destruction caused by the tornado or the cooperation of Huntsvillians in dealing with its effects.<sup>11</sup>

The third major natural disaster, Hurricane Andrew, caused far more damage when it struck south Florida and Louisiana on 24 August 1992. In fact, it was the most expensive natural disaster in U.S. history and the largest disaster relief effort undertaken by the Corps of Engineers. Property damage was estimated at \$20 billion. Andrew destroyed or damaged 82,000 businesses and left 160,000 people homeless. Thirty Corps families lost everything in Hurricane Andrew and Typhoon Omar, which occurred in the Pacific at very nearly the same time.<sup>12</sup> Ten Huntsville Division employees went to Miami to assist in the recovery effort. The Hurricane Andrew Recovery Office operated from the former Eastern Airlines office building at the Miami International Airport, leased by the General Services Administration. Volunteer workers were housed in hotels and motels north of Miami, some as far away as Fort Lauderdale. Their normal working day was twelve hours on and twelve hours off. As in Kuwait, the stricken area south of Miami was divided into geographic sections, with a contractor designated for each section. Each contractor was issued an “umbrella” contract for the cleanup and reconstruction of that particular section. Because of these efforts, as with the other disasters, Division personnel

were able to help fellow Americans during their time of crisis.<sup>13</sup>

A constant undercurrent to the events of this period was the Corps of Engineers realignment process as well as the reorganization under Base Realignment and Closure (BRAC). Impending reorganization of the military led to uncertainty and rumors about the future of Huntsville Division which only increased when no clear information was forthcoming. Although Division personnel continued their successful work on the various missions, morale deteriorated as the employees’ worrying increased. To counter these trends and communicate what was definitely known, the Commander of Huntsville Division, Colonel Phillip Hall, held his first “Town Meeting” of all Division employees on 9 May 1991. Colonel Hall shared the information he had, and employees had the opportunity to ask questions and clarify issues. This first “town meeting” was so successful that Col. Hall made plans to continue its use to discuss issues of importance to employees of the Corps and of Huntsville Division in particular. The commander held other “town meetings” in 1992, the first one on 15 January.<sup>14</sup>

As Division employees went about their work, many continued to be distracted by the uncertainties of reorganization, but one program that made enormous strides in rebuilding morale was an Armywide effort called the Army Communities of Excellence (ACOE), directed by Army Chief of Staff General Carl Vuono. The goal of ACOE was to achieve excellent places within the Army for soldiers, civilians, and their families to live, to train, and to work. When Lieutenant General H.J. Hatch, Chief of Engineers, announced that the Corps would support the ACOE program, Huntsville Division formed a committee to develop a plan of action. Even before a plan was developed, the initial emphasis was on the facility (improving its attractiveness and functionalism by a “general cleaning-up”) and on personal relations (by increasing consideration and efficiency).<sup>15</sup> Huntsville’s ACOE Committee used employee surveys to determine needs, and the surveys indicated that employees were particularly interested in recognition, facilities, training, employee support, and health. The resulting program focused on these issues in order to make life pleasanter for internal customers, that is, Corps personnel.<sup>16</sup>



To meet the employees' expressed need for recognition, four new awards were created in 1991: the Commander's Leadership Award, the Employee of the Year Award, the Teamwork Award, and the Engineer of the Year Award. There were also other formal awards and informal "done good" peer recognitions. Another innovation was the "Commander's Cookout," where Colonel Hall and staff members provided a free cookout for all Division employees—a festive and very public recognition of management's appreciation of employees.<sup>17</sup> Furthermore, establishment of competitive awards on both the local and Corps levels stimulated interest in the ACOE program itself. In 1989, with 80 percent of all divisions, districts, field operating activities, and laboratories competing, Huntsville Division received an Award of Merit. On both the local and Corps levels, the purpose of the contest was to recognize excellence in working environments and service for Corps employees and to reward offices that achieved the goals of the program. The major areas considered in evaluation were facilities excellence and excellence in service.<sup>18</sup> In 1991 Huntsville Division won second place in its category in the Armywide ACOE contest, and four employees went to the Pentagon to receive the \$50,000 award check.<sup>19</sup>

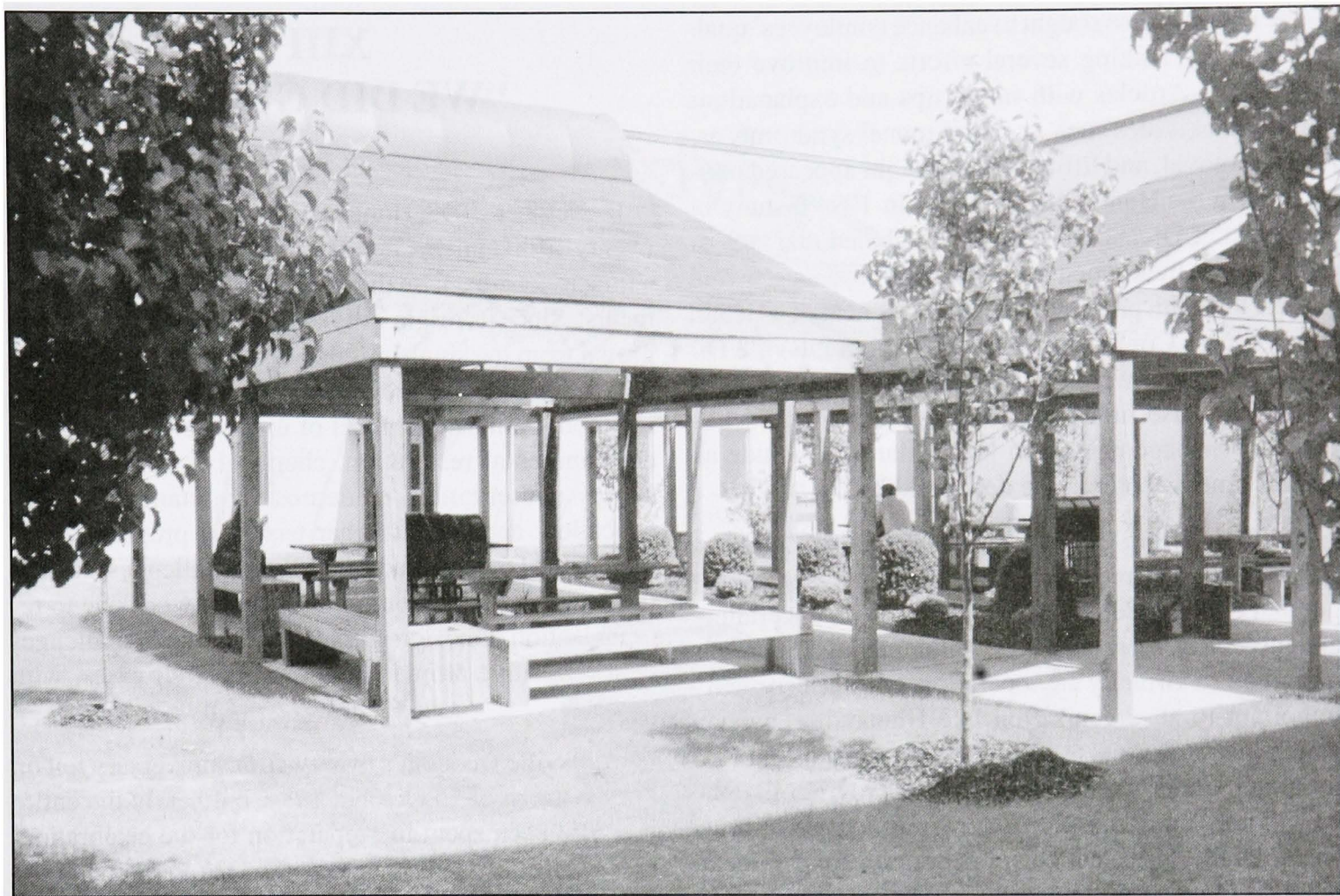
The most noticeable aspect of ACOE was facility improvement. In the summer of 1991 the building's internal courtyard, heretofore a drab, unadorned service area, was turned into a garden space. The courtyard, which had been nothing more than a passageway with space for air conditioning equipment, was redesigned with paved walkways, four picnic tables and benches, two grills, a partial covering reminiscent of tropical roof construction, and attractive vegetation. The courtyard became a comfortable place for breaks, recreation, informal conferences, and work-related luncheons. Architecture-Engineering (A-E) produced the design, ACOE funds paid for the expenses, and Huntsville Division employees volunteered much of the labor. The building at 106 Wynn Drive has all the charm of a medieval fortress under siege, and the contrast with the "new" courtyard was extreme. This change in atmosphere resulted in a more aesthetically-pleasing work environment and a happier work force. This self-help activity was a major factor in Huntsville Division's receiving the runner up position in the special category of the entire ACOE competition.<sup>20</sup>

Huntsville Division also improved its facilities through cleaning, beautification, and better use of space. In 1989 Huntsville instituted what became an annual "Clean-Up Week," with Friday being designated as "Blue Jeans Day." At one employee's suggestion the bare walls of hallways were decorated with art, almost exclusively color photographs taken by Huntsville Division personnel. A "Deck the Walls" committee selected those to be displayed from all the submitted photographs and arranged for their enlargement and display in simple, reusable frames. The displays were changed at least annually, beginning in August 1991.<sup>21</sup> In the same month, the Public Affairs Office began to use space in the lobby to tell visitors to the building about Huntsville Division. Simple racks displayed books and brochures about the Division's history, special abilities, and accomplishments.<sup>22</sup>

ACOE facilities improvement at Huntsville Division included making the work place more safe. Slippery vinyl floor tiles were credited with causing 75 percent of all on-the-job accidents, so Huntsville Division persuaded the building's other occupants to cooperate in laying carpet in the main hallways. It was expected that not only would accidents decrease, but also that the building would be more quiet and attractive.<sup>23</sup> Other safety projects included the installation of emergency lighting in all restrooms and the installation of a public address system which would allow the security guards to warn personnel in the event of an emergency, such as a tornado.<sup>24</sup>

A third employee concern that ACOE sought to address was improved personnel training. Many programs originated during this period to sharpen the management skills of supervisors, meet employee needs, and encourage employee development. Because of its mission, many supervisors in Huntsville Division were highly trained in one or more technical fields but had little or no training or experience in management. To combat this problem, Division management created the Leadership/Management Intern Program. Then in March 1991 the Division held the first of several mandatory management training for supervisors. Other courses were offered to improve the work force. The Directorate of Human Resources conducted a career enhancement training program, "Career Bridging," in April 1990, with





**Figure 25.** The court-yard break area.

a second session in August 1991. Sixty-one clerical and administrative support employees attended a confidence building course, "Know Your Successful Self," sponsored by the Federal Women's Program, in June 1991.<sup>25</sup> With increase in the number and grade-ranking of female employees, Division leaders paid more attention to their needs and interests. Huntsville Division was the first Corps of Engineers organization to provide four hours of Prevention of Sexual Harassment Training to all the employees. To assist employees in their self-development, video-based college courses became available. Several Division offices held numerous seminars and workshops, ranging from one hour to a day, on various topics throughout the year.<sup>26</sup>

To improve worker morale, which was the fourth employee concern, Huntsville Division instituted many programs that provided support to its employees. To accommodate employees with special needs, Division

management developed several part-time positions. The most successful of these involved job sharing, wherein two part-time staff assistants shared a single position. Because each worked up to thirty-two hours, the Division got sixty-four hours of work from a forty-hour slot. Flexibility was an important emphasis. In 1989, Division management began to allow employees to work nine hour days and accrue an hour of leave per day to be used at their convenience. The Division also encouraged sensitivity to employees with problems. Numerous caring committees provided financial help to the needy or sent flowers and gifts to employees going through personal crises. In order to encourage stronger family relationships, the Division Activities Association raised funds for several family events to take place on holidays and special occasions like the Annual Awards Day. Through such simple efforts, the Division hoped to "build a more productive and loyal workforce."<sup>27</sup>



The Division also sought to enhance employees' quality of life by making several efforts to improve their well-being. Articles with safety tips and explanations of important issues such as carpal tunnel syndrome, asbestos removal, and lifting heavy weight appeared periodically in the Huntsville Bulletin. In 1991 a study of the health of Division personnel concluded that lack of exercise was their worst problem. Employee's growing interest in health prompted the establishment of a Health and Wellness Committee in June 1992. Huntsville Division personnel were not only permitted but were encouraged to use fitness facilities at Redstone Arsenal. Division management even made plans to include an on-site fitness center in the new building.<sup>28</sup>

The period from 1989 on was one of funding cutbacks, downsizing, and reorganization. Changes were pending that could affect every employee. With uncertainty and insecurity, morale had been plummeting. Morale is important to virtually any operation, but it is especially important to an organization like Huntsville Division which has such diverse activities requiring specialized training. Under the circumstances, a program like the ACOE was a major asset. By creating a sense of pride and solidarity, it provided something of great value at relatively low cost—improved morale.

During this time of rapid change and insecurity, the uncertainties of military realignment were at times worrisome, but through open communication, installation improvement, and employee support, Division management were able to alleviate much of the stress. What is most amazing is how little these problems seemed to affect job performance. During this time, Division employees served above and beyond the call of duty. They were more than willing to donate time, money, and effort to support the Persian Gulf War or provide aid during Hurricanes Andrew and Hugo, and after the tornado hit Huntsville. During these moments of need is when Huntsville Division truly shines.

## XIII

### “WE DID GOOD”

In October 1992 Huntsville Division celebrated its twenty-fifth anniversary. It was a festive occasion and a time to look back on the Division's many accomplishments. Since its origin in 1967, Huntsville Division had grown from the single mission of supporting the Ballistic Missile Defense Program to dozens of missions that required the most technical of expertise: procurement, environmental restoration, chemical demilitarization, energy conservation, modernization, standardization, education, and several other technical programs. Although the Division had faced grave challenges, such as the personnel reductions and increased work due to reorganization, Division employees met these challenges with a positive attitude and, in almost all cases, with success.

Huntsville Division's twenty-fifth anniversary fell on the afternoon of 15 October 1992, but nearly the entire year had been spent in preparation for the celebration. The Public Affairs Office took the lead in planning the events, and a fifteen-member Silver Anniversary Committee convened in February 1992 to establish procedures and programs and to publicize the celebration. This was an extraordinarily diligent committee, and it dealt very well with a multitude of logistical problems. Under this committee's planning, numerous events led up to the final day of celebration. A twenty-fifth anniversary logo design contest sparked interest at the beginning. The Annual Awards Day Picnic in June carried the theme. Special exhibits in the building at 106 Wynn Drive publicized the history of the division. Silver Anniversary/Army Communities of Excellence coins, designed and financed by the ACOE Committee, were minted by the Division. Articles in the Huntsville Bulletin and the Huntsville Times announced the events and encouraged enthusiasm.<sup>1</sup>

After months of building anticipation, 15 October finally arrived. The anniversary party, the third annual Retirees Open House in the morning, a luncheon for the retirees at the Bevill Center, and a lunch meeting of the Society of American Military Engineers meant that three





**Figure 26.** The 25-year anniversary coin design.

hundred guests (including forty-two retirees who had been invited) and Division personnel enjoyed a full day of festivities.<sup>2</sup> The afternoon celebration was held in the cafeteria of the building at 106 Wynn Drive, which had been decorated for the occasion. One of the highlights of the afternoon occurred when Joseph A. Bethay, Associate Director of the National Aeronautics and Space Administration, Marshall Space Flight Center, presented to Huntsville Division the Silver anniversary Medallion flown aboard the Space Shuttle *Endeavor* STS-47, on its mission of 12-20 September 1992.<sup>3</sup> After numerous

other introductions, speakers, and presentations, Major General Peter J. Offringa presented the keynote speech which reflected on the role of Huntsville Division. "It began," he spoke, "with one mission—one very important mission . . . . Someone was needed to design and construct facilities needed for the deployment of the Army's SENTINEL Ballistic Missile Defense System." He described how the Division gained new missions: procurement for the U.S. Postal Service in 1971, support of NASA's Marshall Space Flight Center, responsibility for the Munitions Production Base Support Con-



struction Program, energy programs, construction standardization, pollution abatement, chemical demilitarization, and many others. "Who," he asked, did the Army turn to for leadership in these programs? "The answer is always the same: Huntsville Division."<sup>4</sup>

Just as General Offringa observed, Huntsville Division had become widely recognized for its technical expertise. For all practical purposes, Huntsville Division did not have technological problems. Occasionally, some successes took a little longer than others, but there were few problems that Division employees could not solve. This is not to suggest that the Division did not face difficulties. There were challenges with money and personnel. With shrinking budgets, hiring freezes, and expanded work caused by military realignment, the Division had faced some trying circumstances.

Obviously, one of the biggest challenges for Huntsville Division was with money. Quite possibly, no person or institution ever has all the funds it thinks it needs, but the American people (the real boss of the U.S. Army Corps of Engineers, in the final analysis) have a bad habit of recognizing necessities without providing funds or accepting policies to solve the problems they face. This has been an increasing handicap as the nation has grown in size and population and therefore in diverse interest groups. For example, there has been consensus that unexploded ordnance, chemical and otherwise, is not good to have near people. The questions have been, how will these materials be removed, to where will they be removed, what will be the disposal methods, and how will this be funded? The average taxpaying citizen has no idea of how much this will cost—except that it will be very expensive and he will have to pay the bill to clean up a mess he did not make.

There were also personnel challenges, both of quality and quantity. While there have been no lay-offs, the inability to hire replacements for people who leave more or less voluntarily has placed pressure on those remaining in the lower grades but has created more critical problems for projects that require specialized and highly skilled personnel at the upper levels. In the rare instance where the Division has had the ability to hire and prospects have been in the market-place, Huntsville Division has not always had the best bargaining chips. Consequently, some very important positions remained va-

cant. If they were filled at all, it was through rotation and individuals wearing an uncomfortable number of hats.

These personnel limitations became particularly acute in the face of an increasing workload. The Headquarters of the Corps of Engineers had appointed Huntsville Division as Center of Expertise for many programs and as the point of contact to many organizations. These added responsibilities meant greater activity, and increasingly, the Division called on its employees to devote more time and energy to their work. Everyone knew that their nation's military needed Huntsville's expertise now more than ever.

In the face of these problems, Huntsville Division became a model of professionalism and teamwork. "The Division looked at itself and it had changed," General Offringa noted. "It had grown: strong and diversified. It was professional, it was capable, it was a national asset."<sup>5</sup> Given the trying circumstances, morale was incredibly high, in many instances amounting to *esprit de corps*. Much credit for this situation goes to the leadership, most of whom made it clear that they recognized and appreciated the contributions of individuals on every level and that they understood the problems of the workers. The Division's participation in the Army Communities of Excellence (ACOE) program also contributed to morale. By making efforts to improve facilities and encourage employee health and happiness, Division personnel began to take pride in their accomplishments. The awards, the occasional watermelon-cutting in the courtyard, and the peer acknowledgment symbolized so simply in the phrase "done good," all helped boost morale to incredibly high levels.

"But what about the future," General Offringa asked, as all of us do. "The future is bright with hope and rich with challenge." He spoke of continued support of NASA, futuristic weapon systems, high-tech projects like MAGLEV, and "solving environmental challenges well into the next century." His vision for the future saw Huntsville Division "leading the Corps to greater accomplishments and service to the nation."<sup>6</sup> With the Division's continuing record of success, and with the growing number of new missions each year, this will no doubt prove to be a true prediction.



# APPENDIX 1

## ER 10-1-22

### DEPARTMENT OF THE ARMY

CERM-O

U.S. Army Corps of Engineers

ER 10-1-22

Washington, D.C. 20314-1000

Regulation

No. 10-1-22

14 December 1992

Organization and Functions

U.S. ARMY ENGINEER DIVISION, HUNTSVILLE

1. Purpose. This regulation defines the mission and the organization of the U.S. Army Engineer Division, Huntsville.

2. Applicability. This regulation is applicable to all HQUSACE/OCE elements, major subordinate commands (MSC), districts, laboratories, and field operating activities (FOA).

3. Reference. ER 10-1-2.

4. Establishment. Huntsville Division was established 15 October 1967 by the Office of the Chief of Engineers General Orders No. 17, dated 9 October 1967.

5. Charter. Huntsville Division has programmatic and functional boundaries in lieu of geographical boundaries. The Huntsville Division charter and programmatic boundaries include those programs, projects, and taskings which:

- a. Are national or broad in scope.
- b. Require integrated facilities or systems that cross geographical division boundaries.
- c. Require commonality, standardization, multiple site adaptation, or technology transfer.

d. Require a centralized management structure for effective control of program development, coordination, and execution.

e. Require functions to be performed that are not normally accomplished by a HQUSACE organizational element.

6. Mission.

a. Continuous mission assignments.

(1) Functions as the single point of contact for USACE with responsibility for all USACE strategic defense activities.

(2) Provides the Corps of Engineers Training Management Center for Professional Development and is responsible for the overall administration and management of the Corps of Engineers Proponent-Sponsored Training Program. Provides Corps of Engineers registrar services for schools in the Department of Defense and the Department of the Army.

(3) Serves as the single point of contact for USACE with the National Aeronautics and Space Administration (NASA) for planning, developing and defining requirements requested by NASA from USACE. Hunts-



ville Division will normally execute industrial type facility requirements and recommend to HQUSACE other USACE Divisions/Districts to execute other type mission requirements.

(4) Serves as the Assigned Responsible Agency for performing centralized procurement to accomplish large-scale and complex procurement and contract administration and providing Government-furnished property and equipment.

(5) Manages and executes the design program for the Army Facilities Components System.

(6) Serves as the agency responsible for Corps of Engineers Criteria Documents Update Program, which includes management, development production, and maintenance of Corps of Engineers guide specification, technical manuals, and other criteria documents. This includes arrangement, operation, and maintenance of automated systems for the Guide Specification Notification Program.

(7) Provides overall Corps of Engineers technical, fiscal, and program management of the Munitions Production Base Support Construction Program. Huntsville Division is specifically charged with performance of facility design of projects where the process systems are common to two or more sites and for performance of other designs where technical complexity or design commonality dictate.

(8) Serves as Assigned Responsible Agency for management of development, implementation, and maintenance of assigned modules of the Automated Engineering and Architectural Design Systems (DD 1391 Processor, CACES, etc).

(9) Performs USACE Life Cycle Project Management (LCPM) responsibilities for the Chemical Stockpile Disposal Program. As the Life Cycle Project Manager, Huntsville Division manages and executes all USACE mission assignments for this multibillion dollar, national program. HUNTSVILLE performs planning; overall process and facility design; equipment acquisition and installation; contract management as delegated by U.S. Army Armament, Munitions and Chemical Command (AMCCOM); and construction placement, surveillance and management of all CSDP, CRYOFRACTURE and

related demilitarization under the technical and programmatic direction of the U.S. Army Chemical Materiel Destruction Agency.

(10) Serves as the agency responsible for planning and conducting remedial investigations and feasibility studies (RIFs) for used and active sites for Office of the Secretary of Defense, Defense Logistics Agency, USACE, and others as assigned.

(11) Serves as Corps of Engineers center of expertise for designated programs, including Energy Monitoring and Control Systems, CHild Development Center, Military Range Modernization Program, Mobilization Planning and Design, Intrusion Detection Systems, Third-Party Contracting, Shared Energy Savings, Demand Site [sic] Management, and Explosive Ordnance.

b. Specialized mission assignments. The capabilities of Huntsville Division encompass engineering technology; design base, program development, and management systems engineering; reliability, operational and maintenance analysis and documentation; and design and analysis of protective systems for hardened interference interface protection. Based on these capabilities, its charter, and its continuous mission, Huntsville Division is assigned numerous specialized missions and tasks in support of the Corps of Engineers, Department of the Army, Department of Defense, Department of Energy, and other federal agencies.

7. Organization. The organization of Huntsville Division is shown at Appendix A. Changes in Mission or major organization blocks require advance approval of HQUSACE in accordance with instructions in ER 10-1-2.

FOR THE COMMANDER:

	[signed]
1 Appendix	WILLIAM D. BROWN
APP A - Organization Chart	Colonel, Corps of Engineers
	Chief of Staff

This regulation supersedes ER 10-1-22, 17 July 1987



# APPENDIX 2

## COMMANDERS, 1988-1992

### COLONEL CHARLES T. MYERS III

Colonel Charles T. Myers III assumed command of the Huntsville Division, U.S. Army Corps of Engineers, on July 15, 1987. He succeeded Colonel Robert S. Lindsay.

Previously, Colonel Myers was Commander and District Engineer of the Jacksonville District, Corps of Engineers. During his military career, Colonel Myers held numerous command and staff assignments in the United States and overseas. Prior to joining the Jacksonville District, he was Assistant Director of Civil Works for Lower Mississippi and the Gulf areas in the Office of the Chief of Engineers in Washington, D.C. His major staff assignments included serving as Facilities Engineer, Ft. Sam Houston, San Antonio, Texas; Nuclear Surety Inspection Team Chief, Inspector General's Office, Headquarters, U.S. Army Europe, Heidelberg, Germany; Deputy District Engineer, Buffalo District, Buffalo, New York; Operations Officer, 45th Engineer Group (Construction), Phu Bai, Vietnam; Executive Officer, 27th Engineer Battalion (Combat), Gia Le, Vietnam; ROTC Staff Officer, Headquarters, U.S. Continental Army Command, Ft. Monroe, Virginia; Operations Officer, 70th Engineer Battalion (Combat), Pleiku, Vietnam; and Instructor and Branch Chief, Atomic Demolition Munitions Branch, U.S. Army Engineer School, Ft. Belvoir, Virginia.

His major command assignments were as Commander, 4th Engineer Battalion, 2d Training Brigade, Ft. Leonard Wood, Missouri; Company Commander, 809th Engineer Battalion (Construction), Phanom Sarakam, Thailand; and as Company Commander, 175h Engineer Battalion (Armored Division), Ft. Hood, Texas.

Included among his military awards are the Legion

of Merit, the Bronze Star Medal (five awards), the Meritorious Service Medal (six awards), Air Medal, Republic of Vietnam Staff Service Medal (first class), Army Commendation Medal, and the Army Achievement Medal.

A native of San Antonio, Texas, Colonel Myers is married to the former Fran Ryan of Martinsville, Virginia. They have a daughter, Ann, and two sons, Frank and Joseph.

### COLONEL PHILIP L. HALL

Colonel Philip L. Hall assumed command of the Huntsville Division, U.S. Army Corps of Engineers, on April 20, 1990. He succeeded Colonel Charles T. Myers III.

Prior to this assignment, he was Commander and District Engineer of the U.S. Army Corps of Engineers' Seattle District. His previous Army assignments include: serving as the Executive to the Assistant Secretary of the Army (Civil Works); Assistant Chief of Staff, U.S. Army Corps of Engineers; Commander of the 5th Engineer Battalion, Fort Leonard Wood, Mo.; Operations and Force Development staff officer, U.S. Army Concept Analysis Agency; Area Engineer, West Point, N.Y.; Engineer Company Commander in Vietnam and Germany and Construction and Equipment Officer for U.S. Navy in the Antarctic on "Operation Deep Freeze."

A 1964 civil engineering graduate of the University of Arizona, Colonel Hall is a registered professional engineer in the state of Virginia. His military education includes graduation from the Engineer Officer Advanced Course, the Command and General Staff College and the Industrial College of the Armed Forces.



Among his military decorations are the Legion of Merit, Bronze Star, Meritorious Service Medal, Army Commendation Medal with Oak Leaf Cluster and "V" Device, Navy Commendation Medal, and the Joint Service Commendation Medal.

Colonel Hall and his wife Marty have two sons, Dan and Kevin.

## **COLONEL ROBERT D. BROWN III**

Colonel Robert "Duncan" Brown III assumed command of the Huntsville Division, U.S. Army Corps of Engineers on 28 July 1992.

A native of Virginia, Colonel Brown earned a MSCE degree from the University of Illinois, an M.B.A. from Monmouth College, and is a registered Professional Engineer in Virginia. He is a 1965 graduate of the U.S. Military Academy, West Point. After graduation, he received his commission in the Infantry and later transferred to the Corps of Engineers.

He served with the 82nd Airborne Division at Fort Bragg, N.C., and in the Dominican Republic. He also served with the 4th Engineer Battalion in Vietnam and has worked as a staff officer in the Readiness Region at Fort Dix, N.J.; Eighth Army Headquarters in Korea; the Waterways Experiment Station at Vicksburg, Ms.; and the Office of the Chief of Engineers in Washington, D.C.

Colonel Brown commanded the 588th Engineer Battalion, Fort Polk, La. and the Portland Recruiting Battalion, Portland, Or. He was the Deputy Brigade Commander, 130th Engineer Brigade, Hanau, Germany and the Commander of the Huntington District. Colonel Brown served as the DEH at Fort Bragg, N.C., from 1988 to 1990. He most recently was the Engineer for U.S. Forces, Korea and Eighth Army.

Colonel Brown is a graduate of the U.S. Army War College and the Command and General Staff College. He is Airborne, Ranger and Pathfinder qualified. His military decorations include the Legion of Merit (3 awards), Bronze Star ("V" Device and Oak Leaf Cluster), Meritorious Service Medal (4 awards) and the Army Commendation Medal.

Colonel Brown and his wife Carolyn reside on Redstone Arsenal.



# **APPENDIX 3**

## **DISTINGUISHED CIVILIAN EMPLOYEES, 1988-1992**

1988 Cecil H. Dobbs - Office Services Manager

1991 Joyce P. Hunter - Chief, R & P and MER Branch

1989 Percy Brewington, Jr. - Chief, Project Management Branch

1992 Bernard J. Trawicky - Chief, Construction Division

1990 Roy E. Edwards - Procurement Officer



# APPENDIX 4

## HUNTSVILLE DIVISION MANPOWER, 1988-1992

	TOTAL	PERMANENT	TEMPORARY		
	<u>STRENGTH</u>	<u>STRENGTH</u>	<u>STRENGTH</u>	<u>WOMEN</u>	<u>MINORITIES</u>
1988	509	475	34	222	82
1989	523	481	42	240	80
1990	525*	485	31	234	70
1991	545*	509	30	247	75
1992	574*	547	24	262	84

\*includes student aids and those on leave without pay



# NOTES

## CHAPTER I

1. ER 870-1-1, Historical Activities: Field Operating Activities Historical Programs, 30 Apr. 1992.

2. James H. Kitchens III, A History of the Huntsville Division, U.S. Army Corps of Engineers, 1967-1976 (Huntsville, AL: U.S. Army Engineer Division, 1978); Louise Schwallie Heidish, A History of the Huntsville Division, U.S. Army Corps of Engineers, 1977-1981 Update (Huntsville AL: U.S. Army Engineer Division, [1983]); Louis Torres, A History of Huntsville Division, U.S. Army Corps of Engineers, 1982-1987 Update (Huntsville, AL: U.S. Army Engineer Division, 1990).

3. "Message from the Division Commander," Huntsville Bulletin (Hereafter cited as Bulletin), Apr. 1991, p. 2; "Commander's Column: Defense Department Cuts Coming; HND In Good Shape For the Future," Bulletin, Sep. 1991, p. 2; "HND Holds Town Meeting," Bulletin, May 1991, pp. 1-2.

## CHAPTER II

1. "Up to Now: a Recap of the Corps' Previous Efforts" Reorganization Wrap-up, Nov. 19, 1992, p. 7; U.S. Army Corps of Engineers Reorganization Plan (Washington, D.C.: Headquarters, U.S. Army Corps of Engineers, n.d.), pp. I, 1-5; "Army News: Proposal Would Close Some Installations, Change Others," Bulletin, Jan. 1989, p. 8; "Military Finance Centers to Merge," Bulletin, July 1990, p. 3; "The 1991 Defense Budget," Bulletin (Special Edition), Mar. 1991, pp. 1-2; "DoD Announces Base Closure List," Bulletin, Apr. 1991, p. 1; "Message From the Chief of Engineers," Bulletin, Apr. 1991, p. 2; "HND Holds Town Meeting," Bulletin, May

1991, pp. 1-2. A Washington-based commission on BRAC had proposed reorganization within the Department of Defense at about the same time as the Corps began its investigations, but the Corps was excluded from the BRAC process because, as Defense Secretary Dick Cheney said, "many of its activities come under different congressional committees than those of other DoD activities."

2. "MEAPO Is Now Transatlantic Div.," Bulletin, Apr. 1991, p. 3; "Corps of Engineers Reorganization Plan Spares HND," Bulletin, Dec. 1992, p. 6; "The New Corps of Engineers," Reorganization Wrap-Up, 19 Nov. 1992, p. 1; "How the Corps Developed This Particular Plan," Reorganization Wrap-Up, 19 Nov. 1992, pp. 4-5; "Administrative Center, Finance Center to Eliminate Reduncancy" [sic], Reorganization Wrap-Up, 19 Nov. 1992, p. 6; "Technical Centers to Provide Expertise," Reorganization Wrap-Up, 19 Nov. 1992, p. 6.

3. Reorganization Plan, pp. 16-20, D1-3; ER 1110-3-109, Engineering and Design Corps-Wide Technical Centers of Expertise Assigned to Major Subordinate Commands and Districts, 15 July 1992; Command Briefing FY 1992, paper copy, 870-5b Historical Files, Corps of Engineers Huntsville Division—Public Affairs Office (CEHND-PAO). Although Centers of Expertise had existed previously, the definition of Mandatory and Technical Centers added new specifications and assignments.

4. "Life Cycle Project Management," Bulletin, May 1990, p. 10; "The New Corps of Engineers," Reorganization Wrap-Up, 19 Nov. 1992, p. 3; Interview, Ken Crawford with Henry Everitt, Huntsville, AL, 16 Dec. 1993; Personal communication, Joe Lofton to author, Huntsville, AL, 26 Sep. 1994; Personal communication, Gerald Dupree to author, Huntsville, AL, 7 Sep. 1994.

5. Memo, Col. Philip L. Hall, sub: Huntsville Division Reorganization, 5 Dec. 1990, with enclosures, 870-5b Historical Files, CEHND-PAO; Ken Crawford, "HND Will Add Two New Directorates Under LCPM Reorganization Plan," Bulletin, Sep. 1990, p. 1; [Bob Howard, ed.], Annual History Report, 1992 (Huntsville, AL: CEHND-PAO, n.d.), p. 39; Huntsville Division Organizational Charts, 870-5b Historical Files, CEHND-PAO.



6. Tony Torres, Federal Women's Program Presentation: Network and Strategic Issues Briefing, Huntsville, AL, 23 June 1993. Author's personal files, 870-5b CEHND-PAO; Reorganization Plan, pp. 16-20; [Howard, ed.], History 1992, p. 36; "Commander's Column: Defense Department Cuts Coming; HND In Good Shape For the Future," Bulletin, Sep. 1991, p. 2; Personal communication, Ellis Gilliland to author. Huntsville, AL, 7 Sep. 1994.

7. Executive Office Staff Notes, 27 Sep. 1989, p. 2. 870-5b Historical Files, CEHND-PAO; Evelyn D. Harris, American Forces Information Service, "Budget Impacts Upon Civilian Employees," Bulletin, Mar. 1990, p. 6; Tim Downey, American Forces Information Service, "DoD Manpower Chief Discusses Civilian Hiring Freeze," Bulletin, Mar. 1990, p. 7; "DoD Hiring Freeze Rules Updated, According to Army," Bulletin, Apr. 1990, p. 4; "Hiring Freeze Rules Changed by DoD To Allow Promotion, Reassignments," Bulletin, May 1990, p. 6; "Changing Times," Bulletin, July 1990, p. 4; "Hiring Freeze Thaws, But Not Corps," Bulletin, May 1991, p. 4.

8. Evelyn D. Harris, American Forces Information Service, "Federal Employees News From Washington, D.C.: Civilian Hiring Freeze Sees Some Changes," Bulletin, May 1992, p. 7; "Commander's Column: Huntsville Division Seeks Relief On High-Grade Freeze," Bulletin, May 1992, p. 2.

9. Judy Wilson, "Norris Named Chief of Staff," Bulletin, Dec. 1988, pp. 4, 8; "Norris Receives Promotion to Rank of Colonel on March 1," Bulletin, Mar. 1989, p. 9; "Deputy Division Engineer To Leave For a New Assignment," Bulletin, Apr. 1990, p. 4; "Change of Command Scheduled for April 29 at UAH," Bulletin, Apr. 1990, p. 1; "New HND Commander," Bulletin, May 1990, p. 1; Change of Command Program, 29 Apr. 1990. 870-5b Historical Files, CEHND-PAO.

10. "Norton Arrives; New Dep. Div. Engineer," Bulletin, Aug. 1990, p. 4; "Commander's Column," Bulletin, July 1992, p. 2; Memo, Col. Robert D. Brown III, sub: Assumption of Command, 28 July 1992. 870-5b Historical Files, CEHND-PAO; "Col. Robert D. Brown III Assumes Command of Huntsville Division," Bulletin, Aug. 1992, p. 1; "Commander's Column," Bulletin, Aug. 1992, p. 2.

11. "HND See Changes In Key Position," Bulletin, Oct. 1991, p. 7; Bob Howard, "New Executive Officer At HND," Bulletin, Sep. 1992, p. 2; [Howard, ed.], History 1992, 39.

12. Memo, Commander, U.S. Army Engineer Division, Huntsville, Sub: Establishment of a Division Urgent Move Project (DUMP) Committee, 2 Mar. 1992. 870-5b Historical Files, CEHND-PAO; Bulletin, Feb. 1992, p. 8; Ken Crawford, "New Facility To Be Bigger, Better, and Less Expensive," Bulletin, Feb. 1992, p. 4; Notice--Notice--Notice," Bulletin, July 1992, p. 2; Bob Joslin, "Wheels Starting To Turn For the Move," Bulletin, Apr. 1992, p. 4; Bob Joslin, "Now They Know That We're Looking," Bulletin, May 1992, p. 11; Bob Joslin, "Four Possible Sites For HND New Home," Bulletin, June 1992, p. 4; Bob Joslin, "Latest DUMP Report Lists Possible Sites," Bulletin, Sep. 1992, p. 8; Bob Joslin, "HND's New Address To Be Announced By Christmas Week," Bulletin, Dec. 1992, p. 2.

## CHAPTER III

1. Interview with Joan Chamness, by Damon Manders, Huntsville, AL, 26 Mar. 1996.

2. [Bob Howard, ed.], Annual History Reoprt. 1991 (Huntsville, AL: CEHND-PAO, n.d.), p. 15; [Howard, ed.], History 1992, pp. 22-23; CEHND Regulation 10-1-2, 18 Jan. 1991, Change 9, App. D.

3. [Bob Howard, ed.], Annual History Report. 1990 (Huntsville, AL: CEHND-PAO, n.d.), p. 36; CEHND Regulation 10-1-2, 18 Jan. 1991, Change 9, App. J.

4. [Howard, ed.], History 1990, p. 36; [Howard, ed.], History 1991, p. 18; [Howard, ed.], History 1992, pp. 33-34.

5. [Howard, ed.], History 1991, p. 16; [Howard, ed.], History 1992, pp. 24-25; CEHND Regulation 10-1-2, 18 Jan. 1991, Change 9, App. H.

6. [Howard, ed.], History 1991, p. 21; [Howard, ed.], History 1992, p. 37; CEHND Regulation 10-1-2, 18 Jan. 1991, Change 9, App. G.



7. Memo, CEHND-OC (Blake Baughman) to CECC-T (Craig Schmauder), 19 July 1991, sub: Baughman Input for Annual Evaluation; Eleven month input, by Bob Baughman, Division Counsel, 45 June 1992; both in 870-5b Historical Files, CEHND-PAO; CEHND Regulation 10-1-2, 18 Jan. 1991, Change 9, App. I.
8. [Howard, ed.], History 1990, pp. 44-46; [Howard, ed.], History 1991, p. 20; [Howard, ed.], History 1992, pp. 37-38; CEHND Regulation 10-1-2, 18 Jan. 1991, Change 9, App. P.
9. [Howard, ed.], History 1990, pp. 47-48; [Howard, ed.], History 1991, p. 23.
10. *Ibid.*, pp. 22-24.
11. [Howard, ed.], History 1992, pp. 38-39.
12. Bill Chaffin, "HND Safety Office Endorses Wrist Support Purchase," Bulletin, Sep. 1992, p. 10; OEWS Newsletter, July 1994; Fact sheet, Wilcox, sub: A-E Services Contract for Facility Systems Safety and Explosives Safety Review Program, 18 Jan. 1990, Issue No. 12, Update 30 Oct. 1992; (This and all Fact sheets cited subsequently are in 870-5b Historical Files, CEHND-PAO).
13. [Howard, ed.], History 1992, p. 36.
14. Sue Baber, "New Electronic Security System To Be Installed Soon," Bulletin, Aug. 1990, p. 5; "Getting the Most Out of Your Badge (Before It Gets the Best of You)," Bulletin, Jan. 1991, pp. 10-11.
15. Sue Baber, "Stolen Property At All-Time High in HND," Bulletin, Dec. 1992, p. 11; [Howard, ed.], History 1992, pp. 36-37.
16. Kitchens, Huntsville 1967-1976, 39; "Blankenship Is VE," Information Bulletin, Apr. 1988, p. 3; "Value Engineering," Information Bulletin, July 1988, p. 3; "Correction," Bulletin, Oct. 1992, p. 11.
17. Judy Wilson, "Value Engineering Affected by Recent Funding Changes," Bulletin, May 1989, p. 10; Bob Howard, "Full-Time Value Engineer Position Established at Huntsville Division," Bulletin, Sep. 1992, p. 6.
18. Judy Wilson, "Value Engineering Affected by Recent Funding Changes," Bulletin, May 1989, p. 10.
19. Memo, Lt. Col. Robert N. Hatton, 5 Nov. 1992, sub: Individual Appointment and Rescissions, 870-5b Historical Files, CEHND-PAO; "Professional and Community Notes: Value Engineer," Bulletin, Aug. 1992, p. 11; [Howard, ed.], History 1991, p. 20.
20. [Ed Lewis], "What Small Business Is," Bulletin, Oct. 1992, p. 7.
21. Ed Lewis, "Women-Owned Businesses Have Banner Year In FY91," Bulletin, Nov. 1991, p. 3; Ed Lewis, "Huntsville Division Featured At Small Business Fair," Bulletin, May 1992, p. 5; Ed Lewis, "Small Business Exceeds FY92 Goals," Bulletin, Oct. 1992, p. 7; [Howard, ed.], History 1990, pp. 50-51; [Howard, ed.], History 1991, p. 25.
22. Ed Lewis, "Women-Owned Businesses Have Banner Year in FY1," Bulletin, Nov. 1991, p. 3; Ed Lewis, "Small Business Exceeds FY92 Goals," Bulletin, Oct. 1992, p. 7; [Howard, ed.], History 1990, p. 50; [Howard, ed.], History 1991, p. 25.
23. Executive Office Staff Notes, 13 May 1988, 870-5b Historical Files, CEHND-PAO; "HND Wins EEO Award," Information Bulletin, May 1988, p. 6; Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO.
24. HND 690-1-13, sub: Civilian Personnel, Equal Employment Opportunity, 20 Aug. 1986, 870-5b Historical Files, CEHND-PAO; [Howard, ed.], History 1992, p. 40.
25. John H. Brown, FY91 Annual Affirmative Employment Program Plan Accomplishment Report and FY92 Update Report For Minorities and Women (Huntsville, AL: U.S. Army Engineer Division, 1992), 24.
26. Frank Hancock, "Black Employment Program Committee Presents Recruitment Methods At Meeting," Bulletin, Sep. 1992, p. 7; Brown, FY91 Employment Program: 2, 6-7; [Howard, ed.], History 1992, p. 40.
27. Brown, FY 91 Employment Program: 14, 17, 25; Brown, FY 92 Employment Program: 25.



28. Memo No. 90-13, Col. Philip L. Hall, 15 May 1990, sub: Policy Statement on Prevention of Sexual Harassment In the Workplace, 870-5b Historical Files, CEHND-PAO; "Army's Policy on Sexual Harassment," Information Bulletin, Mar. 1988, p. 3; American Forces Information Service, "DoD Wants to Use Plain Language to Help End Sexual Harassment," FWP Newsletter, Spring 1991, p. 2; John H. Brown and Alicia Shivers, "Sexual Harassment Is Not a Joke," Bulletin, Dec. 1991, pp. 4-5; ARNEWS, Secretary of the Army Stone Views Sexual Harassment As Intolerable," Bulletin, Aug. 1992, p. 5.

29. Executive Office Staff Notes, 20 Jan. 1988, 870-5b Historical Files, CEHND-PAO; "POSH Instruction To Be Scheduled Soon," Bulletin, Jan. 1989, p. 4; Brown, FY 91 Employment Program: 9.

30. Executive Office Staff Notes, 26 July 1988, 870-5b Historical Files, CEHND-PAO; "Emphasis Program," Information Bulletin, Mar. 1988, p. 3; "Sheridan Named BEP Manager," Information Bulletin, June 1988, p. 1.

31. Executive Office Staff Notes, 8 June 1988, 870-5b Historical Files, CEHND-PAO; Judy Wilson, "Federal Women's Program," Bulletin, Apr. 1990, p. 6; "Federal Women's Program," Bulletin, Apr. 1990, p. 6; Alisa Shivers, "Survey Shows Little Interest in On-Site Child Care Facility," Bulletin, Apr. 1991, p. 13; Alisa Shivers, "Women's History Month News," Bulletin, Apr. 91, p. 12; Frank Hancock, "New Committee Members On Federal Women's Program," Bulletin, Nov. 1991, p. 6; "Federal Women's Program Starts FY With New Committee Members," FWP Newsletter, Fall 1991, p. 3; Alisa Shivers, "Survey Shows Little Interest For In-House Child-Care Center At Wynn Drive Facility," Bulletin, Mar. 1992, p. 9; Alisa W. Shivers to Col. Phil Hall, Bulletin, June 1992, p. 2; Alisa W. Shivers, "Thanks to All Who Have Helped FWP the Past Three Years," FWP Bulletin, Fall 1992, p. 9; New Members in FWP," Bulletin, Dec. 1992, p. 9.

## CHAPTER IV

1. Kitchens, Huntsville 1967-1976, pp. 1-113, 123-131; Heidish, 1977-1981 Update, pp. 9-13; Torres, 1982-1987 Update, pp. 1.1, and 3.1-2; Ruth Currie-McDaniel and Claus R. Martel, The U.S. Army Strategic Defense Command: Its History and Role in the Strategic Defense Initiative, 3d ed. ([Huntsville]: Historical Office, U.S. Army Strategic Command, 1989); Fact sheet, Goodman, sub: Ground Based Free Electron Laser-Technology Integrated Experiment (GBFEL-TIE), 15 Jan. 1985, Issue No. 9, Updated 20 Jan. 1988; Interview with John Romeo, by Damon Manders, Huntsville, AL, 1 Feb. 1996.

2. Fact sheet, Romeo, sub: U.S. Army Space and Strategic Defense Command (USASSDC) Program (Formerly Called Ballistic Missile Defense (BMD)), 31 July 1983, Issue No. 43, Updated 31 Oct. 1992; Ken Crawford, "Division Helps SDC Before Successful ERIS Launch," Bulletin, Feb. 1991, pp. 1 and 5; Currie-McDaniel and Martel, SDC, 61-73; [Howard, ed.], History 1992, pp. 5-6; Romeo Interview by Manders. Associated with HEDI were the Exoatmospheric Re-Entry Interceptor Subsystem Launch Complex (ERIS) and the Space Based Kinetic Kill Vehicle Launch Complex (now known as SABIR); other USASSDC projects at this time include STARBIRD Launch Complexes, and Exoatmospheric Discrimination Experiment (EDX), the Ground Based Radar-Test (GBR-T), the Ground Based Interceptor (GBI) Launch Facilities, and the Ground Based Surveillance and Tracking (GBST) System. Construction of ERIS and SABIR were more or less complete by 1990, while HEDI was being contracted in 1992; STARBIRD and EDX had become Navy responsibilities; and GBR-T, GBI, and GBST had become part of NMD.

3. Fact sheet, Goodman, sub: Ground Based Free Electron Laser-Technology Integrated Experiment (GBFEL-TIE), 15 Jan. 1985, Issue No. 9, Updated 20 Jan. 1988; Fact sheet, Peak, sub: Groundbased Free Electron Laser-Technology Integrated Experiment (GBFEL-TIE), 15 Jan. 1985, Issue No. 16, Updated 30 Jan. 1990, and Issue No. 18, Updated 20 July 1990. Romeo Interview, by Damon Manders.



4. Fact sheet, Jones, sub: U.S. Army Strategic Defense Command (USASDC) Program (Formerly Called Ballistic Missile Defense (BMD)), 31 July 1983, Issue No. 32, Updated 30 Jan. 1990; Fact sheet, Carillo, sub: U.S. Army Strategic Defense Command (USASDC) Program (Formerly Called Ballistic Missile Defense (BMD)), 31 July 1983, Issue No. 36, Updated 31 Jan. 1991; Fact sheet, Romeo/Starling, sub: National Missile Defense (NMD) Program, 27 July 1992, Issue No. 2, Updated 31 Oct. 1992; Fact sheet, Romeo, sub: Environmental Restoration at Stanley R. Mickelson Safe-guard Complex, Nekoma, ND, 31 Oct. 1991, Issue No. 4, Updated 31 July 1992; [Howard, ed.], History 1991, p. 13; [Howard, ed.], History 1992, p. 5; Romeo Interview, by Manders.

5. Fact sheet, Allen, sub: NASA Advanced Solid Rocket Motor (ASRM) Project Support, 28 Apr. 1989, Issue No. 4, Updated 30 Jan. 1990, and Issue No. 8, Updated 31 Jan. 1991; Fact sheet, Blankinship, sub: NASA Advanced Solid Rocket Motor (ASRM) Project Support, 28 Apr. 1989, Issue No. 15, Updated 30 Oct. 1992, and Issue No. 18, Updated 29 Oct. 1993; Judy Wilson, "Huntsville Signs New Agreement With NASA," Bulletin, May 1989, pp. 1, 4; "Ground Broken At Yellow Creek, Miss., Site," Bulletin, May 1990, p. 6; [Howard, ed.], History 1991, p. 8; [Howard, ed.], History 1992, pp. 8-9. Construction was approximately 80 percent completed when Congress directed termination of the program in 1993.

6. Fact sheet, Starling, sub: Large Rocket Motor Disposal Program, Near Critical Fluid Methods--MICOM Support, 31 Jul. 1982 [1991 ?], Issue No. 4, Updated 30 Oct. 1992; Ken Crawford, "HND Design Study to Help Destroy Old Rocket Motors," Bulletin, Oct. 1992, p. 5; Media Query No. 92-46, 16 Sep. 1992, Media Query FY 1992, 870-5b Historical Files, CEHND-PAO; [Howard, ed.], History 1992, p. 14; Personal Communication, Jarel Starling to Damon Manders, Huntsville, AL, 25 Apr. 1996. The primary method investigated was near critical fluid disposal, a process wherein ammonia is used as a solvent to dissolve liquid propellant components.

7. Fact sheet, Mullinix, sub: Advanced Technology Activity, 30 Oct. 1987, Issue No. 2, Updated 29 Jan. 1988; Fact sheet, Loyd, sub: Advanced Technology

Activity, 30 Oct. 1987, Issue No. 21, Updated 30 Oct. 1992. Interview with John Lloyd, by Damon Manders, Huntsville, AL, 19 Jan. 1996.

8. Fact sheet, Loyd/Young, sub: EMP/TEMPEST, 15 Jan. 1987, Issue No. 9, Updated 29 Jan. 1988; Fact sheet, Public Affairs Office, sub: EMP/TEMPEST Support, n.d.; Lloyd Interview, by Manders.

9. Fact sheet, Muse, sub: Power Reliability Enhancement Program (PREP), 31 Jan. 1982, Issue No. 32, Updated 31 Jan. 1991; Lloyd Interview, by Manders.

## CHAPTER V.

1. [Howard, ed.], History 1992, p. 20.

2. "What We Do: Branch B, Contracting Division," Bulletin, Nov. 1989, p. 6; [Howard, ed.], History 1990, pp. 19 and 26; [Howard, ed.], History 1991, p. 12; [Howard, ed.], History 1992, p. 20.

3. D.O.D./MRI Program Schedule, 870-5b Historical Files, CEHND-PAO; Judy Wilson, "Division Begins Contract for Medical Diagnostic Device," Bulletin, May 1989, p. 4; "Commander's Column: Contracting Directorate Supports Other Agencies," Bulletin, Apr. 1992, p. 2; [Howard, ed.], History 1990, pp. 26 and 32; [Howard, ed.], History 1991, pp. 8 and 12; [Howard, ed.], History 1992, p. 20.

4. [Howard, ed.], History 1990, p. 25; [Howard, ed.], History 1991, pp. 12-13; [Howard, ed.], History 1992, p. 20; "Commander's Column: Contracting Directorate Supports Other Agencies," Bulletin, Apr. 1992, p. 2.

5. Fact sheet, Muse, sub: Computerized Tomography (CT) Beam Scanner Program, 22 Oct. 1992, Issue [No.] 1; [Howard, ed.], History 1991, p. 13; [Howard, ed.], History 1992, p. 10.

6. "What We Do: Branch B, Contracting Division," Bulletin, Nov. 1989, p. 6; Fact Sheet, Rizvi, sub: A-E Services Contracts for Medical Facilities Planning and Design Services, 18 Jan. 1990, Issue No. 11, Updated 30 Oct. 1992; Personal Communication, Tahir Rizvi to Damon Manders, Huntsville, AL, 15 Feb. 1996.



7. [Howard, ed.], History 1990, pp. 26, 29-31.
8. [Howard, ed.], History 1990, p. 26; [Howard, ed.], History 1991, p. 12.

## CHAPTER VI

1. "Environmental Policy Takes Shape," Bulletin, Sep. 1990, p. 6.
2. Mission Fact Sheet, Army Pollution Abatement Program (APAP), Oct. 1979, Issue 3; Fact Sheet, Shearer, sub: Pollution Abatement, 31 Jan. 1982, Issue 10, updated 30 April 1984; Defense Environmental Restoration Program, Annual Report to Congress for Fiscal Year 1994 (Washington D.C.: U.S. Government Printing Office, 1995), pp. C-1 and C-2; Interview, Damon Manders with Margarite Simmons, Huntsville, AL, 19 Dec. 1995; Interview, Damon Manders with Sam Sang, Huntsville, AL, 19 Dec. 1995; Heidish, 1977-1981 Update, pp. 30-1; Torres, 1982-1987 Update, pp. 4.1-4.
3. Fact sheet, Bob Nore, sub: Defense Environmental Restoration Program (DERP), 30 Apr. 1984, Issue No. 23, updated 27 Oct. 1989; Fact sheet, Phil Loftis, sub: Defense Environmental Restoration Program For Formerly Used Defense Sites (DERP-FUDS), 30 Apr 1984, Issue No. 30, updated 31 July 1991; Judy Wilson, "Ordnance Removal to Begin at Site," Bulletin, Sep. 1990, p. 5; Torres, 1982-1987 Update, p. 4.3.
4. Fact sheet, Bob Nore, sub: Defense Environmental Restoration Program (DERP), 30 Apr. 1984, Issue No. 16, updated 22 Jan. 1988; Interview, Damon Manders with David Douthat, Huntsville, AL, 20 Dec. 1995.
5. Fact sheet, Bob Nore, sub: Defense Environmental Restoration Program (DERP), 30 Apr. 1984, Issue No. 16, updated 22 Jan. 1988; Douthat Interview, by Manders; "Environment: HND Named Ordnance MCX," Bulletin, June 1990, p. 5; [Howard, ed.], History 1990, p. 18.
6. Fact sheet, Wilcox, sub: Mandatory Center of Expertise (MCX) and Design Center for Explosive Ordnance (EXO) Engineering, 30 July 1990, Issue No. 3,

updated 31 Jan. 1991; Fact sheet, Nore, sub: Mandatory Center of Expertise (MCX) and Design Center for Explosive Ordnance (EXO) Engineering, 30 July 1990, Issue No. 9, updated 31 July 1992; [Bob Howard, ed.], History 1990, p. 18; [Bob Howard, ed.], History 1991, p. 8; "Fact Box: How Ordnance Is Removed," Bulletin, June 1991, p. 10.

7. Fact sheet, Bob Nore, sub: Defense Environmental Restoration Program (DERP), 30 Apr. 1984, Issue No. 16, updated 22 Jan. 1988; Douthat Interview, by Manders.

8. Fact sheet, Phil Loftis, sub: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS), 30 Apr. 1984, Issue No. 24, updated 30 Jan. 1990.

9. "Project Update: Ordnance Removal in New Jersey," Bulletin, June 1991, p. 10.

10. Fact sheet, Nore, sub: Mandatory Center of Expertise (MCX) and Design Center for Explosive Ordnance (EXO) Engineering, 30 July 1990, Issue No. 9, updated 31 July 1992; Fact sheet, Nore, DERP FUDS OEW Program, 30 July 1990, Issue No. 10, updated 30 Oct 1992; Fact sheet, Bill Stephenson, sub: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS), 30 Apr. 1984, Issue No. 36, updated 30 Oct. 1992.

11. Fact sheet, Nore, sub: Mandatory Center of Expertise (MCX) and Design Center for Explosive Ordnance (EXO) Engineering, 30 July 1990, Issue No. 9, updated 31 July 1992; Fact sheet, Nore, sub: DERP FUDS OEW Program, 30 July 1990, Issue No. 10, updated 30 Oct. 1992; ER 1110-3-109, Engineering and Design Corps-Wide Technical Centers of Expertise Assigned to Major Subordinate Commands and Districts, 15 July 1992; Fact sheet, Bill Stephenson, sub: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS). 30 Apr. 1984, Issue No. 36, updated 30 Oct. 1992.

12. Command Briefing FY 1991, paper copy, 870-5b Historical Files, CEHND-PAO; [Howard, ed.], History 1991, p. 6; [Howard, ed.], History 1992, p. 11.



13. Fact sheet, Boswell, sub: Defense Logistics Agency (DLA)--Installation Restoration Program (IRP), 29 Oct 1985, Issue No. 9, updated 22 Jan. 1988; Torres, 1982-1987 Update, p. 4.4; Command Briefing FY 1991, paper copy, 870-5b Historical Files, CEHND-PAO; Fact sheet, Lee, sub: Defense Reutilization and Marketing Service (DRMS)--Conforming Storage Program, 30 Apr. 1984, Issue No. 15, updated 22 Jan. 1988.

14. Fact sheet, Lee, sub: Defense Reutilization and Marketing Service (DRMS)--Conforming Storage Program, 30 Apr. 1984, Issue No. 20, updated 28 July 1989.

15. Fact sheet, Green, sub: Defense Reutilization and Marketing Service (DRMS)--Conforming Storage Program, 30 Apr. 1984, Issue No. 31, updated 30 Oct. 1992.

16. Fact sheet, Boswell, sub: Defense Logistics Agency (DLA)--Installation Restoration Program (IRP), 29 Oct. 1985, Issue No. 9, updated 22 Jan. 1988.

17. Fact sheet, East, sub: US Army Materiel Command (AMC) Environmental Support, 31 Jan. 1991, Issue No. 42, updated 30 Oct. 1992.

18. Ibid.

19. Ibid.; Personal Communication, Gary East to Damon Manders. Huntsville, AL, 2 Jan. 1996.

20. Fact sheet, East, sub: US Army Materiel Command (AMC) Environmental Support, 31 Jan. 1991, Issue No. 42, updated 30 Oct. 1992; [Howard, ed.], History 1992, pp. 11-12; beginning in 1993 an MOA allowed installations to choose their IRP executors, and several chose the Division; however, in 1994 HQUSACE reiterated its policy of decentralization, and the Division began working with regional Corps Divisions to comply; Fact sheet, East, sub: US Army Materiel Command (AMC) Environmental Support, 31 Jan. 1991, Issue No. 46, updated 29 Oct. 1993; Issue No 46, updated 29 Oct. 1994 .

21. Fact sheet, East, sub: Reimbursable Installation Restoration Support, 15 Jan. 1992, Issue No. 4, updated 30 Oct. 1992.

22. Fact sheet, East, sub: Environmental Policy Development Support, Office of the Deputy Assistant Sec-

retary of Defense for Environmental Affairs (ODASD[E]), 4 Nov. 1985, Issue No. 27, updated 30 Oct. 1992.

23. Fact sheet, Muse, sub: Base Realignment and Closure II, Layaway of Ammo Plants, 31 Oct. 1990, Issue No. 5, Updated 31 Oct. 1991; Fact sheet, King, sub: Base Realignment and Closure (BRAC) Program for OEW Removal Actions, 4 Sep. 1992, Issue No. 2, updated 30 Oct. 1992.

24. Engineering Division Weekly Staff Notes, 3 and 24 May, 8 Nov. 1988, 870-5b Historical Files, CEHND-PAO; "Environment: HND Named Ordnance MCX," Bulletin, June 1990, p. 5; [Howard, ed.], History 1990, p. 18; [Howard, ed.], History 1991, pp. 7, 13; [Howard, ed.], History 1992, p. 12.

25. Fact sheet, Romeo, sub: Design of Effluent Treatment System (ETS), 31 July 1992, Issue No. 6, updated 31 Oct. 1992; [Howard, ed.], History 1992, p. 7.

26. Fact sheets, Burton, sub: Partners For Environmental Progress (PEP), 31 Jan. 1992 [15 Dec. 1990 ?], Issue No. 7, updated 31 Jan. 1992, and 15 Dec. 1990, Issue No. 8, updated 31 July 1992, and Issue No. 9, updated 30 Oct. 1992; Personal communication, Terry Burton to author. Huntsville, AL, 7 Sep. 1994.

## CHAPTER VII.

1. Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO; Office of Technology Assessment (OTA), Congress of the United States, Background Paper: Disposal of Chemical Weapons, Alternative Technologies (Washington, D.C.: [U.S. Government Printing Office], 1992), pp. 1-2; Heidish, 1977-1981 Update, p. 32; Torres, 1982-1987 Update, pp. 4.4-5.

2. OTA, Disposal of Chemical Weapons, pp. 1-2, 19; Heidish, 1977-1981 Update, p. 32.

3. Memo, MG Peter J. Offringer to Commander, U.S. Army Engineer Division, Huntsville, sub: Construction Organization for the Chemical Stockpile Disposal Program (CSDP), 8 May 1992, 870-5b Historical Files,



CEHND-PAO; OTA, Disposal of Chemical Weapons, pp. 13-16; Ken Crawford, "USACE Designates HND As Agent for Chemical Demil Construction," Bulletin, May 1992, p. 1; [Howard, ed.], History 1990, p. 13; [Howard, ed.] History 1992, p. 1; Heidish, 1977-1981 Update, p. 32; Personal communication, Jerry Mullinix to author. Huntsville, AL, 7 Sep. 1994.

4. OTA, Disposal of Chemical Weapons, pp. 1-2.

5. Ibid., pp. 1, 17, quote on p. 6.

6. Ibid., 4, 6, 16-17, 25, 31-35, 39; Fact sheet, Mullinix, sub: Support to the U.S. Army Chemical Materiel Destruction Agency (USACMDA) (Provisional) formerly Program Manager for Chemical Demilitarization (PMCD) formerly the Office of the Program Executive Officer--Program Manager for Chemical Demilitarization (PEO-PM Cml Demil) formerly Office of the Program Manager for Chemical Munitions (OPMCM) formerly the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) Program for Demilitarization and Lethal Chemical Munitions, 18 Sep. 1981, Issue No. 44, Updated 30 Oct. 1992.

7. OTA, Disposal of Chemical Weapons, p. 25.

8. [Howard, ed.], History 1991, p. 1; [Howard, ed.], History 1992, p. 1.

9. Fact sheet, Mullinix, sub: Support to the U.S. Army Materiel Destruction Agency . . . , 18 Sep. 1981, Issue No. 44, Updated 30 Oct. 1992; Chemical Demilitarization Staff Notes, 30 Dec. 1992, p. 3, 870-5b Historical Files, CEHND-PA; Personal communication, Jerry Mullinix to author. Huntsville, AL, 7 Sep. 1994.

10. OTA, Disposal of Chemical Weapons, pp. 5-6, 20.

11. Ibid., pp. 3-5, 18-20.

12. Ibid., pp. 20-23; Fact sheet, Mullinix, sub: Support to the U.S. Army Chemical Material Destruction Agency . . . , 18 Sep. 1981, Issue No. 44, Updated 30 Oct. 1992; U.S. Signs Agreement to Aid Russia in Destruction of Chemical Stockpile," Bulletin, Aug. 1992, p. 2; Bob Howard, "HND to Participate in International Historical Event," Bulletin, Sep. 1992, p. 4.

13. Chemical Demilitarization Staff Notes, 18 Nov.

and 30 Dec. 1992, 870-5b Historical Files, CEHND-PAO. Huntsville Division's role has expanded, and it later placed people in Russia to assist in manning an office to define requirements and to do estimates for the construction of an incinerator destruction facility in Russia. Personal communication, Jerry Mullinix to author. Huntsville, AL, 7 Sep. 1994.

14. Chemical Demilitarization Staff Notes, 30 Dec. 1992, 870-5b Historical Files, CEHND-PAO; Interview, Judy Wilson with Henry Everitt. Huntsville, AL, 15 Dec. 1993; Everitt interview, by Crawford; [Tooole] Utah Chem. Demil. Construction Wrap-up, May 1993, SPK-IM-SG, 11 min., Sacramento, CA: U.S. Army Engineer District, 1993, videocassette, Corps of Engineers Huntsville Division--Chemical Demilitarization Directorate (CEHND-CD). Construction on the main facility was finished by July 1993, and since that date it has been undergoing systemization and final permit processing with the state of Utah. According to Wynelle Kirkham, toxic operations should begin by the summer of 1996.

15. "BZ Plant Goes Hot," Bulletin, May 1988, p. 1; [Howard, ed.], History 1990, p. 13; [Howard, ed.], History 1991, p. 1.

16. Judy Wilson, "Ground Breaking Major Milestone for Chem Demil," Bulletin, Nov. 1989, p. 1; Judy Wilson, "Demilitarization Training Facility Contract Awarded," Bulletin, July 1989, p. 1.

17. "JACADS Begins Operational Tests: Finally 'Goes Hot,'" Bulletin, Aug. 1990, p. 1; Torres, 1982-1987 Update, p. 4.6.

18. "Army Issues Decision to Construct Disposal Plant at Anniston Depot," Bulletin, Oct. 1992, p. 6; "What We Do: Chemical Demil Section," Bulletin, May 1990, p. 8; [Howard, ed.], History 1991, p. 1; [Howard, ed.], History 1992, pp. 1-2.

19. "Excellence by Design 1990 Awards," Program for 1990 DoD Design Awards Ceremony, 870-5b Historical Files, CEHND-PAO; Ken Crawford, "JACADS Wins DoD Design Award," Bulletin, June 1991, p. 1; Bulletin, July 1990, p. 9.



## CHAPTER VIII.

1. Heidish, 1977-81 Update, pp. 34-9; Torres, 1982-87 Update, pp. 4.17-19, 5.3-5.

2. Fact sheet, Brown, sub: Energy Engineering Analysis Program (EEAP), 31 Dec. 1980, Issue No. 33 (FINAL), Updated 28 July 1989; Personal Communication, Phil Brown to Damon Manders, Huntsville, AL, 19 Jan. 1996.

3. Fact sheet, Holland, sub: Energy Monitoring and Control System (EMCS), 31 Dec. 1980, Issue No. 37, Updated 31 July 1990; [Howard, ed.], History 1990, p. 15; [Howard, ed.], History 1991, pp. 2 and 13.

4. Ibid.; Fact sheet, Holland, sub: Energy Monitoring and Control System (EMCS), 31 Dec. 1980, Issue No. 33, Updated 28 July 1989; Fact sheet, Arrington, sub: Utility Monitoring Control Systems (UMCS), 31 Dec. 1980, Issue No. 46, Updated 30 Oct. 1992; Command Briefing FY 1991, paper copy, 870-5b Historical Files, CEHND-PAO; [Howard, ed.], History 1990, p. 15; [Howard, ed.], History 1991, pp. 2 and 13; "DoD Says to Use Less Energy . . . HND Program Can Help Meet Goal," Bulletin, Sep. 1991, p. 10.

5. Fact sheet, Elliott, sub: Shared Savings Contracting, 31 Mar. 1987, Issue No. 12, Updated 22 Jan. 1988, and Issue No. 31, Updated 31 Oct. 1992; Directorate of Programs and Project Management, Significant Project Issues, 7 Apr. 1982; Command Briefing FY 1991 and FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO; Therese Odom, "Army Signs First Shared Savings Contract," Information Bulletin, Sep. 1988, pp. 1-2; "Six From HND To Be Honored For Shared Energy Savings," Bulletin, Oct. 1989, p. 6; Lynda Murray, "Shared Energy Savings Project Will Save Government Near \$7.8 Million," Bulletin, Feb. 1991, p. 4;

Judy Wilson, "Shared Energy Savings: New Software Programs Will Help Installations Determine Feasibility," Bulletin, Sep. 1991, p. 3; Bob Starling, "HND Develops Propane-Air Plant SES at Fort Stewart," Bulletin, Nov. 1992, p. 8; [Howard, ed.], History 1990, p. 23; [Howard, ed.], History 1991, pp. 5 and 12; [Howard, ed.], History 1992, pp. 14-15, 19; Personal Communication, Lynda Murray to author. Huntsville, AL, 3 Nov. 1992.

6. Fact sheet, Starling, sub: Third Party Contracting (TPC), 31 July 1983, Issue No. 36, Updated 31 Oct. 1992.

7. Ibid.; [Howard, ed.], History 1992, p. 14.

8. [Howard, ed.], History 1992, p. 14.

9. Fact sheet, Starling, sub: Demand Side Management (DSM), 15 Jan. 1992, Issue No. 4, 31 Oct. 1992; [Howard, ed.], History 1992, p. 14.

10. Fact sheet, Rizvi, sub: Defense Fuel Supply Center Program for Development of Pipeline Operations Manuals for Various Defense Fuel Support Points (DFSP), 21 Jan. 1992, Issue No. 1, and Issue No. 4, Updated 30 Oct. 1992; [Howard, ed.], History 1991, p. 9; [Howard, ed.], History 1992, p. 16.

## CHAPTER IX.

1. Heidish, 1977-1981 Update, pp. 14-18, 20, 22-3, 33; Torres, 1982-1987 Update, 3.4-10, 4.9-12, 14.

2. Torres, 1982-1987 Update, 3.6; Fact sheet, Belew, sub: Production Base Support Construction Program (PBSCP), 31 Dec. 1980, Issue No. 36, Updated 31 Jan. 1991, and Issue No. 40, Updated 30 Apr. 1992; Fact sheet, Durski, sub: Production Base Support Construction Program (PBSCP), 31 Dec. 1980, Issue No. 42, Updated 30 Oct. 1992; [Howard, ed.], History 1991, pp. 3-4; [Howard, ed.], History 1992, p. 4.

3. Fact sheet, Starling/Amons, sub: RDX/HMX Expansion Program, 31 July 1984, Issue No. 15, Updated 29 Jan. 1988; Fact sheet, Starling, sub: RDX/HMX Expansion Program, 31 July 1984, Issue No. 25, Updated 31 July 1990; Issue No. 29, Updated 31 July 1991; Issue No. 32, Updated 30 Apr. 1992; Issue No. 33, Updated 30 Oct. 1992; Personal Communication, Ned Rizzardi to Damon Manders, Huntsville, AL, 19 Jan. 1996; Judy Wilson, "Pre-Proposal Meeting in Louisiana Draws Interest," Bulletin, Jan. 1989, p. 1; Judy Wilson, "Production Base Support Mission Sees Major Activities," Bulletin, Dec. 1989, p. 11; [Howard, ed.], History 1992, pp. 7-8.



4. Fact sheet, Youkey, sub: Continuous Nitrocellulose (CNC) Modernization, 29 Apr. 1988, Issue No. 9, Updated 30 Apr. 1990; Fact sheet, Carillo, sub: Continuous Nitrocellulose (CNC) Modernization, 29 Apr. 1988, Issue No. 14, Updated 31 July 1991; Personal Communication, Ned Rizzardi to Damon Manders, Huntsville, AL, 19 Jan. 1996.
5. Fact sheet, Bellew, sub: Single Base Propellant Modernization at Badger and Indiana AAPs, 22 July 1988, Issue No. 6, Updated 27 Oct. 1989, Issue No. 7, Updated 30 Jan. 1990, Issue No. 11, Updated 30 Jan. 1991; Personal Communication, Ned Rizzardi to Damon Manders, Huntsville, AL, 19 Jan. 1996.
6. Command Briefing FY 1991 and FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO; Sam Bolin, Loftis, and Light, Range Modernization, Engineering Division Weekly Staff Notes, 5 Jan., 26 Jan., 12 Apr., 19 Apr., 3 May, 17 May, 14 June 1988, 870-5b Historical Files, CEHND-PAO; Fact sheet, Petty, sub: Range Modernization, 30 June 1981, Issue No. 45, Updated 31 Oct. 1992; [Howard, ed.], History 1992, p. 15; Judy Wilson, "Twenty-Nine Palms Work Nears Completion," Bulletin, Mar. 1989, pp. 1, 4; "Correction," Bulletin, Apr. 1989, p. 4; Bob Howard, "HND to Design Ranges for Marines," Bulletin, June 1992, p. 4.
7. Fact sheet, Grim, sub.: AFCS, 31 Dec. 1980, Issue No. 39, Updated 1991; Fact sheet, Petty, sub: Army Facilities Components System (AFCS), 31 Dec. 1980, Issue No. 46, Updated 30 Oct. 1992; Personal Communication, Ed Scott to Damon Manders, Huntsville, AL, 26 Jan. 1996; [Howard, ed.], History 1990, pp. 9-10.
8. [Howard, ed.], History 1992, p.15.
9. Fact sheet, Gentry, sub: Mobilization Designs ("M" Designs), 30 June 1981, Issue No. 43, Updated 39 Oct. 1992.
10. Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO; Fact sheet, Wilson, sub: Criteria Documents Update Program (CDUP), 16 Jan. 1981, Issue No. 34, Updated 28 July 1989; Issue No. 38, Updated 31 Jan. 1992; Issue No. 45, Updated 30 Oct. 1992.
11. Fact sheet, Rizvi, sub: Operation and Maintenance Engineering Enhancement (OMEE) Program, 17 Jan. 1989, Issue No. 26, Updated 31 Oct. 1992.
12. Ibid.; Fact sheet, Lee, sub: Operation and Maintenance Engineering Enhancement Program, 17 Jan. 1989, Issue No. 5, [Updated] 30 Jan. 1990; Fact sheet, Rizvi, sub: Operation and Maintenance Engineering Enhancement (OMEE) Program, 17 Jan. 1989, Issue No. 21, Updated 31 July 1991; Ken Crawford, "Proper Planning For O & M Saves Costly Problems Later," Bulletin, Oct. 1991, p. 5.
13. Fact sheet, Thompson, sub: Configuration Management, 31 Dec. 1980, Issue No. 29, Updated 30 Oct. 1992.
14. Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO.
15. Fact sheet, Mark Fleming, sub: DD Form 1391 Processor System, 13 Mar. 1985, Issue No. 29, Updated 30 Oct. 1992; [Howard, ed.], History 1992, p. 2.
16. Fact sheet, Mark Fleming, sub: DD Form 1391 Processor System, 13 Mar. 1985, Issue No. 30, Updated 30 Oct. 1992.
17. Fact sheet, Mark Fleming, sub: Economic Analysis System (ECONPACK), 30 Oct. 1985, Issue No. 30, Updated 30 Oct. 1992.
18. Fact sheet, Mark Fleming, sub: Automated ENG Form 3086 Module (mainframe and PC-Version), 18 Oct. 1988, Issue No. 18, Updated 30 Oct. 1992; Fact sheet, Valerie Shippers, sub: Automated ENG Form 3086 Module, 18 Oct. 1988, Issue No. 6, Updated 30 Jan. 1990.
19. Fact sheet, Larry Werner, sub: Computer Aided Cost Estimating System (CACES), 15 Mar. 1985, Issue No. 12, Updated 29 Jan. 1988; Fact sheet, James Nichols, sub: Computer Aided Cost Engineering Support (CACES) Activities, 15 Mar. 1985, Issue No. 29, Updated 30 Oct. 1992; [Howard, ed.], History 1990, pp. 11-12; [Howard, ed.], History 1992, p. 3.



20. Fact sheet, Mark Fleming, sub: Army Criteria Tracking System (ACTS), 20 Oct. 1989, Issue No. 13, Updated 30 Oct. 1992; [Howard, ed.], History 1992, p. 2.

21. Fact sheet, Valerie Shippers, sub: Army Reserve Life Cycle Management (LCM) System, 30 Apr. 1990, Issue No. 2, Updated 31 July 1990; Fact sheet, John Nicholls, sub: Army Reserve Life Cycle Management Automation (LCMA) System, 30 Apr. 1990, Issue No. 10, Updated 22 July 1992; Fact sheet, John Nicholls, sub: Engineer Management Automation Army Reserve (EMAAR) (Formerly LCMA), 30 Apr. 1990, Issue No. 11, Updated 30 Oct. 1992; Cy Lisenby, "Life Cycle Management Program Reporting System Implemented," Bulletin, Nov. 1991, p. 4; [Howard, ed.], History 1992, p. 2; Personal Communication, Larry Werner to Damon Manders, Huntsville, AL, 22 Jan. 1996. After 1992, EMAAR was no longer considered part of the PAX system in terms of work assignments.

22. Judy Wilson, "Maj. Gen. Offringa Unveils New Program For HND," Bulletin, Aug. 1992, p. 3; [Howard, ed.], History 1992, p. 22.

23. Fact sheet, Elliott, sub: Combat Materiel Research Laboratory (CMRL), 1 Mar. 1991, Issue No. 2, Updated 31 July 1991.

24. Ibid.; [Howard, ed.], History 1991, p. 4.

## CHAPTER X.

1. Fact sheet, Suever, sub: Magnetically Levitated (MAGLEV) Program, 27 Oct. 1989, Issue No. 12, Update[d] 30 Oct. 1992; [Howard, ed.], History 1991, p. 6; [Howard, ed.], History 1992, pp. 12-13; Judy Wilson, "Maglev Mission Zooms Into HND," Bulletin, July 1990, p. 1.

2. Fact sheet, Suever, sub: Magnetically Levitated (MAGLEV) Program, 27 Oct. 1989, Issue No. 12, Update[d] 30 Oct. 1992; [Howard, ed.], History 1992, pp. 12-13.

3. NMI Staff, Final Report on the National Maglev Initiative (NMI) (Washington, DC: [U.S. Government Printing Office ?], 1993, Report No. DOT/FRA/AMI-93/03, Gov. Accession No. PB 94-100237; Personal communication, Rick Suever to author. Huntsville, AL, 7 Sep. 1994.

4. Fact sheet, Suever, sub: Magnetically Levitated (MAGLEV) Program, 27 Oct. 1989, Issue No. 12, Update[d] 30 Oct. 1992; [Howard, ed.], History 1991, p. 6; [Howard, ed.], History 1992, p. 13.

5. Fact sheet, Suever, sub: Magnetically Levitated (MAGLEV) Program, 27 Oct. 1989, Issue No. 12, Update[d] 30 Oct. 1992; [Howard, ed.], History 1992, p. 13.

6. Fact sheet, Suever, sub: Magnetically Levitated (MAGLEV) Program, 27 Oct. 1989, Issue No. 12, Update[d] 30 Oct. 1992; [Howard, ed.], History 1992, p. 13. The final report of the NMI (containing the results of the technology investigations and the marketing and economic analyses and recommending proceeding with prototype development) was presented to Congress in Nov. 1993; Final Report on the NMI.

7. Fact sheet, Allen, sub: Support to the USACE Engineer Topographic Laboratory (ETL), 31 Dec. 1980, Issue No. 35, Updated 30 Jan. 1990, and Issue No. 35 [sic], Updated 30 Apr. 1990; Fact sheet, Muse, sub: Support to the USACE Engineer Topographic Laboratory (ETL), 31 Dec. 1980, Issue No. 38, Updated 31 Jan. 1991.

8. Fact sheet, Muse, sub: Support to the USACE Engineer Topographic Laboratory (ETL), 31 Dec. 1980, Issue No. 42, Updated 30 Oct. 1992.

9. Fact sheet, Allen, sub: Support to the USACE Engineer Topographic Laboratory (ETL), 31 Dec. 1980, Issue No. 35, Updated 30 Jan. 1990, and Issue No. 35 [sic], Updated 30 Apr. 1990.

10. Fact sheet, Muse, sub: Support to the USACE Engineer Topographic Laboratory (ETL), 31 Dec. 1980, Issue No. 38, Updated 31 Jan. 1991, and Issue No. 41, Updated 31 July 1992.



11. Fact sheet, Lee, sub: Engineering Surveys of Facility Deficiencies at DRMS Field Activities Worldwide, 10 Jan. 1989, Issue No. 7 [Updated] 30 July 1990.

12. Ibid.

13. Fact sheet, Lee, sub: Engineering Surveys of Facility Deficiencies at DRMS Field Activities Worldwide, 10 Jan. 1989, Issue No. 4, [Updated] 24 Oct. 1989.

14. Fact sheet, Lee, sub: Engineering Surveys of Facility Deficiencies at DRMS Field Activities Worldwide, 10 Jan. 1989, Issue No. 3, [Updated] 28 July 1989, and Issue No. 4, [Updated] 27 Oct., 1989, and Issue No. 5, [Updated] 30 Jan. 1990.

15. Fact sheet, Lee, sub: Engineering Surveys of Facility Deficiencies at DRMS Field Activities Worldwide, 10 Jan. 1989, Issue No. 7, [Updated] 30 July 1990.

16. Ibid.

17. Ibid.; Fact sheet, Lee, sub: Engineering Surveys of Facility Deficiencies at DRMS Field Activities Worldwide, 10 Jan. 1989, Issue No. 5, [Updated] 30 Jan. 1990.

18. Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO; Fact sheet, Brown, sub: Intrusion Detection Systems (IDS), 31 July 1986, Issue No. 25, Updated 30 Jan. 1990, and Issue No. 27, Updated 31 July 1990; Fact sheet, Arrington, sub: Intrusion Detection System (IDS), 31 July 1986, Issue No. 32, Updated 31 Oct. 1991, and Issue No. 34, Updated 30 Apr. 1992; Personal Communication, Kenneth Arrington to Damon Manders, Huntsville, AL, 26 Jan. 1996; [Howard, ed.], History 1990, p. 17; Torres, 1982-1987 Update, pp. 4.12.

19. Fact sheet, Muse, sub: Intelligence and Security Command (INSCOM), 31 Jan. 1982, Issue No. 9, Updated 30 Oct. 1992; [Howard, ed.], History 1991, p. 8; Personal Communication, Dick Martin to Damon Manders, Huntsville, AL, 15 Feb. 1996; Personal Communication, John Brown to Damon Manders, Huntsville, AL, 15 Feb. 1996.

20. Paul LaHoud, Engineering Directorate, Civil Structures Division, Structures Branch--Miscellaneous Papers, 870-5b Historical Files, CEHND-PAO.

21. Ibid., Julian Hamilton, Jr., Structural Engineer, HND, "Review of the Status of the FEMA Key Worker Blast Shelter Program—Update of Research Results and Multiple Shelter Designs," a paper presented at the Corps of Engineers Engineering Conference, St. Louis, MO, 27 June-1 July, 1988, copy at HND, Engineering Division, Civil Structures Directorate.

22. Fact sheet, Wilson, sub: FEMA Key Worker Blast Shelter (KWBS) Program, 9 July 1982, Issue No. 31, Updated 30 Apr. 1990.

23. Ibid.

24. Ibid.; Fact sheet, Wilson, sub: FEMA Key Worker Blast Shelter (KWBS) Program, 9 July 1872, Issue No. 32, Updated 31 July 1990.

## CHAPTER XI.

1. American Forces Information Service, "Training Program Puts DoD Leaders On the Fast Track," Bulletin, June 1990, p. 5; American Forces Information Service, "Viewpoint--Part II. Commentary: Career Development Is Essential," Bulletin, June 1990, p. 3; Army News Service, "Leader Development Takes Spotlight," Bulletin, July 1990, p. 11.

2. Ken Crawford, "Leadership Has Transition Seminar," Bulletin, July 1990, p. 3.

3. "Leadership-Management Interns," Bulletin, Feb. 1991, p. 6.

4. "LMI Group Gets Off To a Busy Start," Bulletin, June 1991, p. 5.

5. Memo, Toni Hamley, sub: Establishment of an Education Committee, 25 Mar. 1992, 870-5b Historical Files, CEHND-PAO; Alisa Shivers, "Leadership Management Interns to Propose Educational Committee," Bulletin, Feb. 1992.

6. Alisa Shivers, "First Leadership-Management Intern Session Finishing in March," Bulletin, Jan. 1992.



7. Announcing: 1992-1993 Huntsville Division Leadership-Management Intern Program: "Training For the Future", (N.P.: n.p., n.d.); "Leadership-Management Interns," Bulletin, Feb. 1991, p. 6; Alisa Shivers, "First Leadership-Management Intern Session Finishing in March," Bulletin, Jan. 1992; "Twelve of Huntsville Division's Best Ready For 1992-93 LMI Session," Bulletin, Apr. 1992, pp. 6-7.
8. July Wilson, "Special Training Teaches How to Deal With the Media," Bulletin, Nov. 1989, p. 4; Agenda, Huntsville Division Public Affairs Office, Media/Public Training Course, 9 Sep. 1992, with attachments; Memo, Kenneth A. Crawford to Col. Norton and J. Mullinix, 24 Sep. 1992, with attachments; both in 870-5b Historical Files, CEHND-PAO; [Judy Griggs, Bob Howard, Bob Huie, Donna Rovere], A Commitment of Excellence . . . Is Huntsville Division's Benchmark, pp. 13-14.
9. Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO.
10. [Howard, ed.], History 1991, p. 10; [Howard, ed.], History 1992, p. 17; Interview, Jeff Seward with Damon Manders, Huntsville, AL: 9 Feb. 1996.
11. [Howard, ed.], History 1991, p. 10; [Howard, ed.], History 1992, p. 17.
12. Seward Interview, by Manders.
13. Ibid.; Fact sheet, Directorate of CE Training Management, Apr. 1993; Tom Bevill Center (Huntsville, AL: U.S. Army Engineer Division, n.d.). Command Briefing FY 1991, paper copy, 870-5b Historical Files, CEHND-PAO; [Howard, ed.], History 1991, p. 11; Seward Interview, by Manders; as the numbers listed in the Command Briefing are projections based on enrollment at that time, the numbers of personnel trained listed in the history report are more accurate.
14. [Howard, ed.], History 1992, 18; Command Briefing FY 1992, paper copy, 870-5b Historical Files, CEHND-PAO; Seward Interview, by Manders; see note 13 concerning the discrepancy of numbers trained.
15. Seward Interview, by Manders; Judy Wilson, "Commander's Course Reaches All Future District Chiefs," Bulletin, Apr. 1989, p. 8.
16. Ibid.; [Howard, ed.], History 1991, p. 10; Seward Interview, by Manders.
17. [Howard, ed.], History 1991, pp. 10-11.
18. Tom Bevill Center; [Howard, ed.], History 1990, pp. 33-35; Seward Interview, by Manders.
19. [Howard, ed.], History 1990, pp. 33-35; Personal Communication, Jeff Seward to Damon Manders, Huntsville, AL, 8 Mar. 1996.
20. Fact sheet, Youkey, sub: CE Training Center, 31 July 1983, Issue No. 25, Updated 27 Oct. 1989; Information Bulletin, Jan. 1988, p. 2.
21. Fact sheet, Youkey, sub: CE Training Center, 31 July 1983, Issue No. 25, Updated 27 Oct. 1989; Fact Sheet, sub: UAH Groundbreaking Ceremony--Opening Remarks; "Bevill Center Dedicated," Information Bulletin, Jan. 1988, pp. 1 and 3.
22. Ibid.
23. "Use Bevill Center For Visitor's Travel," Bulletin, Jan. 1989, p. 3.
24. Janice Perry, "Bevill Center Reworked For More Classrooms and Offices," Bulletin, Sep. 1992, p. 7; [Howard, ed.], History 1992, p. 18.
25. Alisa Shivers, "HND Personnel Judge School Science Fair," Bulletin, Mar. 1992, p. 5; Philip Irvine, "Opinion: You, a Science Fair Judge?," Bulletin, Mar. 1992, p. 5.
26. Memo, Toni Hamley, sub: Establishment of an Education Committee, 25 Mar. 1992, 870-5b Historical Files, CEHND-PAO.
27. Memo, Toni Hamley, sub: Lessons Learned--Spring Holiday Engineering Program, 18 May 1992, 870-5b Historical Files, CEHND-PAO.
28. Minutes of Commander's Weekly Staff Meeting, 26 Jan. 1989, 870-5b Historical Files, CEHND-PAO.



## CHAPTER XII.

1. Lt. Col. Charles Willey, "Massive Deployment Took American Troops to the Desert," Bulletin, Sept. 1990, p. 3; "Over There: HND Family Serving in Gulf," Bulletin, Feb. 1991, p. 5; "Corps of Engineers Involved in Team Deployed to Assist in Gulf Oil Spill," Bulletin, Feb. 1991, p. 5; Bob Howard, "Corps' Re-building Job in Kuwait as efficient as Desert Storm," Bulletin, Nov. 1991, p. 5; see also Desert Storm Update in History Files 870-5b, CEHND-PAO.

2. "Division 'Family' Members Called Up for Desert Shield," Bulletin, Jan. 1991, p. 4; "Over There: HND Family Serving in Gulf," Bulletin, Feb. 1991, p. 5; "Huntsville Division 'Stormers,'" Bulletin, Apr. 1991, p. 8; "People," Bulletin, Aug. 1991, p. 7; "Professional and Community Notes," Bulletin, June 1991, p. 8, and Sep. 1991, p. 8.

3. American Forces Information Service, "Civilians Have a Role in Operation," Bulletin, Apr. 1991, p. 8.

4. Bob Howard, "Corps' Rebuilding Job in Kuwait as Efficient as Desert Storm," Bulletin, Nov. 1991, p. 5.

5. Ken Crawford, "AFCS Provides Desert Storm Data," Bulletin, Jan. 1991, p. 1.

6. Ibid.

7. Ken Crawford, "Desert Shield Continues: Medical Imaging System Could Save Valuable Assets in Future," Bulletin, Nov. 1990, p. 1, 6; [Howard, ed.], History 1991, 13.

8. Army News Service, HQUSACE and staff reports, "Army, Corps of Engineers Involved in Hugo Aftermath," Bulletin, Oct. 1989, p. 4.

9. Ken Crawford, Judy Wilson, and Donna Wandel, "Tornado Affects Us All," Bulletin, Dec. 1989, p. 1; "Tornado," Bulletin, Dec. 1989, p. 3. For the best photographic journal of the tornado, see Huntsville Tornado, Nov. 15, 1989, 4:37 p.m.: A Diary of Destruction (Sun City Arizona: C.F. Boone Publishing Co., The Huntsville Times and The Huntsville News, 1990).

10. Ken Crawford, Judy Wilson, and Donna Wandel, "Tornado Affects Us All," Bulletin, Dec. 1989, p. 1; "Tornado," Bulletin, Dec. 1989, p. 3; "New Officer Survives Total Destruction of Gates Cleaners," Bulletin, Dec. 1989, p. 4; "Watkins Helps Rescue Survivors From Wreckage of Store," Bulletin, Dec. 1989, p. 5; "Employees and Worker's Spouse Survive the Storm," Bulletin, Dec. 1989, p. 6; "Here Are Just Some of Our Division Tornado Stories," Bulletin, Dec. 1989, p. 7.

11. Judy Wilson, "Writer Shares Her Personal Feelings About the Tornado," Bulletin, Dec. 1989, p. 6.

12. Bob Howard, "HND Employees Answer the Call in Hurricane Andrew Clean-Up," Bulletin, Oct. 1992, p. 4; Bob Howard, "HND Has Opportunity to Help Corps Families Recover From Storm Effects," Bulletin, Oct. 1992, p. 5; Marty Martin, "Hurricane Andrew Clean-Up Biggest Job Yet For Corps," Bulletin, Dec. 1992, p. 7.

13. Bob Howard, "HND Employees Answer the Call in Hurricane Andrew Clean-Up," Bulletin, Oct. 1992, p. 4; Marty Martin, "Hurricane Andrew Clean-Up Biggest Job Yet For Corps," Bulletin, Dec. 1992, p. 7.

14. Bright Ideas At Huntsville Division Start With . . . Army Communities of Excellence FY91, p. 10; "HND Town Meeting Slated," Bulletin, Jan. 1992, p. 10.

15. "Viewpoint: Support Division Community of Excellence Program," Bulletin, Feb. 1989, p. 2.

16. Memo, Col. Philip L. Hall, sub: Army Communities of Excellence, 1 Oct. 1991, 870-5b Historical Files, CEHND-PAO; Col. Philip L. Hall, "Bright Ideas At Huntsville Division Start With the Division Commander's Vision," Bright Ideas At Huntsville Division Start With . . . Army Communities of Excellence FY91.

17. Ibid., pp. 2, 10, 13.

18. Army New Service, "Army News," Bulletin, Apr. 1989, p. 12; HQUSACE and staff reports, "Division Wins Corps Army Communities of Excellence Award of Merit During Competition," Bulletin, Sep. 1989, p. 4.

19. "People," Bulletin, May 1992, p. 10; "25th Anniversary Coin Is High Flier," Bulletin, Oct. 1992, p. 9.



20. Memo, Co. Philip L. Hall, sub: Army Communities of Excellence, 1 Oct. 1991, 870-5b Historical Files, CEHND-PAO; Communities of Excellence, 6 and 7; "Army Communities of Excellence," Bulletin, May 1991, p. 8; Bob Howard, "ACOE Plants Flowers," Bulletin, June 1992, p. 9; "Professional and Community Notes: ACOE," Bulletin, Aug. 1991, p. 3, and Sep. 1991, p. 8.

21. "This Friday Is 'Blue Jean Day,'" Bulletin, June 1989, p. 5; "Dust Flies During Clean Up Week," Bulletin, July 1989, p. 10; Memo, Col. Philip L. Hall, sub: Army Communities of Excellence, 1 Oct. 1991, 870-5b Historical Files, CEHND-PAO; Communities of Excellence, 5, 7-8; "Army Communities of Excellence," Bulletin, May 1991, p. 8; "Professional and Community Notes: ACOE," Bulletin, Sep. 1991, p. 8.

22. Communities of Excellence, pp. 6-7.

23. *Ibid.*, pp. 6, 8, 28.

24. *Ibid.*, p. 28.

25. *Ibid.*, pp. 13, 14.

26. [Judy Griggs, Bob Howard, Bob Huie, Donna Rovere], A Commitment of Excellence . . . Is Huntsville Division's Benchmark, pp. 13-14.

27. *Ibid.*, pp. 15-6; Communities of Excellence, p. 12.

28. Bill Chaffin, "HND Safety Office endorses wrist support purchase," Bulletin, Sept. 1992, p. 10; Bob Howard, "Exercising relieves repetitive hand movement pains," Bulletin, April 1992, p. 8; "Asbestos: Asbestos removal effort a concern for the Division," Bulletin, July 1989, p. 5; Bob Howard, "Back injuries on the rise at HND," Bulletin, March 1992, p. 7; "Huntsville Division's health report card is in," Bulletin, Feb. 1991, p. 3; Commitment of Excellence, pp. 14-15.

## CHAPTER XIII

1. Memo, Toni Hamley, Executive Assistant, sub: Establishment of a Silver Anniversary Committee, 24 Feb. 1992; Minutes, Sandy Oliver, Public Affairs Secretary: Silver Anniversary Committee Meeting, 17 Mar. 1992; Memo, Ken Crawford, Chief, Public Affairs, Silver Anniversary Chairperson, sub: After-Action Report, 25th Anniversary Celebration, 16 Oct. 1992; all in 870-5b Historical Files, CEHND-PAO.

2. Minutes, Sandy Oliver, Public Affairs Secretary: Silver Anniversary Committee Meeting, 24 July 1992, and 6 Oct. 1992; Memo, Ken Crawford, Chief, Public Affairs, Silver Anniversary Chairperson, sub: After-Action Report, 26th Anniversary Celebration, 16 Oct. 1992; all in 870-5b Historical Files, CEHND-PAO.

3. Minutes, Sandy Oliver, Public Affairs Secretary: Silver Anniversary Committee Meeting, 21 Apr. 1992, and 6 Oct. 1992; Letter, Col. Robert D. Brown III to Mr. Joseph A. Bethay, 24 Oct. 1992; all in 870-5b Historical Files, CEHND-PAO.

4. Major General Offringa's final speech, 15 Oct. 1992, pp. 1-7 and 11, Silver Anniversary Celebration After-Action Report, Oct. 16, 1992—CEHND-PAO.

5. *Ibid.*, p. 7.

6. *Ibid.*, p. 12, 14.



# BIBLIOGRAPHY

Either the original or a copy of virtually all the sources cited in this work will be found in 870-5b Historical Files, Corps of Engineers, Huntsville Division—Public Affairs Office (CEHND-PAO).

## RECORDS: ARCHIVAL AND FILE MATERIALS

Agenda, Huntsville Division Public Affairs Office, Media/Public Training Course, 9 Sep. 1992, with attachments.

Change of Command Program, 20 Apr. 1990.

Charts of Huntsville Division Organization, 1 Feb. 1988, 1 Feb. 1989, 1 Feb. 1990, 1 Feb. 1991,

1 Feb. 1992, 1 Nov. 1992, 1 Feb. 1993.

Chemical Demilitarization Staff Notes.

Command Briefing FY 1991, paper copy.

Command Briefing FY 1992, paper copy.

Directorate of Programs and Project Management, Significant Project Issues, 7 Apr. 1992.

D.O.D./MRI Program Schedule.

Engineering Division Weekly Staff Notes.

Excellence by Design 1990 Awards. Program for 1990 DOD Design Awards Ceremony.

Executive Office Staff Notes.

Fact Sheets, Commander's quarterly.

Fact Sheets, Public Affairs Office.

LaHoud, Paul. Engineering Directorate, Civil Structures Division, Structures Branch. Miscellaneous papers.

Letter, Col. Robert D. Brown III to Mr. Joseph A.

Bethay, 24 Oct. 1992.

Media Query No. 92-46, 16 Sep. 1992, Media Query FY 1992.

Memoranda

CEHND-OC (Blake Baughman) to CECC-T (Craig Schmauder), 19 July 1991.

Col. Robert D. Brown, 28 July 1992.

Commander, U.S. Army Engineer Division, Huntsville, 2 Mar. 1992.

Kenneth A. Crawford to Col., Norton and J. Mullinix, 24 Sep. 1992, with attachments.

Ken Crawford, Chief, Public Affairs, Silver Anniversary Chairperson, 16 Oct. 1992.

No. 90-30, Col. Philip L. Hall, 15 May 1990.

Col. Philip L. Hall, 5 Dec. 1990, with enclosures.

Col. PHilip L. Hall, 1 Oct. 1991.

Toni Hamley, Executive Assistant, 24 Feb. 1992.

Toni Hamley, 25 Mar. 1992.

Toni Hamley, 18 May 1992.

Lt. Col. Robert N. Hatton, 5 Nov. 1992.

MG Peter J. Offringa to Commander, U.S. Army Engineer Division, Huntsville, 8 May 1992.

Minutes of Commander's Weekly Staff Meeting, 26 Jan. 1989.

Minutes of Silver Anniversary Committee Meetings, 17 Mar, 21 Apr., 24 July, and 6 Oct. 1992.

Regulations

HNDR 690-1-13

HNDR 10-1-2



ER 10-1-22

ER 870-1-1

ER 1110-3-109

Silver Anniversary Celebration, After-Action Report, 16 Oct. 1992.

## BOOKS

Announcing: 1992-1993 Huntsville Division Leadership-Management Intern Program: "Training for the Future." N.P.: N.P., N.D.

Brown, John H. FY91 Annual Affirmative Employment Program Plan Accomplishment Report and FY91 Update Report For Minorities and Women. Huntsville, AL: U.S. Army

Engineer District, 1992.

Currie-McDaniel, Ruth, and Martel, Claus R. The U.S. Army Strategic Defense Command: Its History and Role in the Strategic Defense Initiative. 3d ed. [Huntsville]: Historical

Office, U.S. Army Strategic Defense Command, 1989.

Defense Environmental Restoration Program, Annual Report to Congress for Fiscal Year 1994.

Washington D.C.: U.S. Government Printing Office, 1995.

Griggs Judy, Howard, Bob, Huie, Bob, Roverre, Donna. A Commitment of Excellence . . . Is Huntsville Division's Benchmark. Huntsville, AL: U.S. Army Engineer Division, 1992.

Bright Ideas At Huntsville Division Start With Army Communities of Excellence FY91.

Huntsville, AL: U.S. Army Engineer Division, 1991.

[Howard, Bob, ed.] Annual History Report, 1990. Huntsville, AL: CEHND-PAO, n.d.

Annual History Report, 1991. Huntsville, AL: CEHND-PAO, n.d.

Annual History Report, 1992. Huntsville, AL: CEHND-PAO, n.d.

Heidish, Louise Schwallie. A History of the Huntsville Division, U.S. Army Corps of Engineers.

1977-1981 Update. Huntsville, AL: U.S. Army Engineer Division, [1983].

Huntsville Tornado, Nov. 15, 1989, 4:37 P.M.: A Diary of Destruction. Sun City, Arizona: C.F.

Boone Publishing Co., The Huntsville Times and The Huntsville News, 1990.

Kitchens, James H. III. A History of the Huntsville Division, U.S. Army Corps of Engineers.

1967-1976. Huntsville, AL: U.S. Army Engineer Division, 1978.

NMI Staff. Final Report on the National Maglev Initiative (NMI). Washington, D.C.: [U.S.

Government Printing Office ?], 1993. Report No. DOT/FRA/AMI-93/D3, Gov.

Accession No. PB 94-100237.

Office of Technology Assessment (OTA), Congress of the United States. Background Paper:

Disposal of Chemical Weapons, Alternative Technologies. Washington, D.C.: U.S.

Government Printing Office], 1992.

Torres, Louis. A History of the Huntsville Division, U.S. Army Corps of Engineers, 1982-1987

Update. Huntsville, AL: U.S. Army Engineer Division, 1990.

Tom Bevill Center. Huntsville, AL: U.S. Army Engineer Division, n.d.

U.S. Army Corps of Engineers Reorganization Plan. Washington, D.C.: Headquarters, U.S. Army Corps of Engineers, n.d.



## NEWSPAPERS

Desert Storm Update

FWP Bulletin

Huntsville Bulletin (before 1989, see Information Bulletin)

Information Bulletin

OEW Newsletter

Reorganization Wrap-Up

## ORAL HISTORY SOURCES

Chamness, Joan. Interviewed by Damon Manders. Huntsville, AL: 26 Mar. 1996.

Douthout, David. Interviewed by Damon Manders. Huntsville, AL: 20 Dec. 1995.

Everitt, Henry. Interviewed by Ken Crawford. Huntsville, AL: 16 Dec. 1993. Videocassette.

Interviewed by Judy Wilson. Huntsville, AL: 15 Dec. 1993. Videocassette.

Lloyd, John. Interviewed by Damon Manders. Huntsville, AL: 19 Jan. 1996.

Romeo, John. Interviewed by Damon Manders. Huntsville, AL: 1 Feb. 1996.

Sang, Sam. Interviewed by Damon Manders. Huntsville, AL: 19 Dec. 1995.

Seward, Jeff. Interviewed by Damon Manders. Huntsville, AL: 9 Feb. 1996.

Simmons, Margarite. Interviewed by Damon Manders. Huntsville, AL: 19 Dec. 1995.

[Tooele] Utah Chemical Demilitarization Construction Wrapup, May 1993, SPK-1M-SG, 11 min., Sacramento, CA: U.S. Army Engineer District, 1993. Videocassette.

Torres, Tony. Federal Women's Program Presentation: Network and Strategic Issues Briefing,

Huntsville, Al, 23 June 1993.

Author's personal files.

## PERSONAL COMMUNICATIONS

Kenneth Arrington to Damon Manders, Huntsville, AL, 26 Jan. 1996.

John Brown to Damon Manders, Huntsville, AL, 15 Feb. 1996.

Phil Brown to Damon Manders, Huntsville, AL, 19 Jan. 1996.

Terry Burton to author, Huntsville, AL, 7 Sep. 1994.

Gerald Dupres to author, Huntsville, AL, 7 Sep. 1994.

Gary East to Damon Manders, Huntsville, AL, 2 Jan. 1996.

Ellis Gilliland to author, Huntsville, AL, 7 Sep. 1994.

Joe Lofton to author, Huntsville, AL, 26 Sep. 1994.

Dick Martin to Damon Manders, Huntsville, AL, 15 Feb. 1996.

Jerry Mullinix to author, Huntsville, AL, 7 Sep. 1994.

Linda Murray to author, Huntsville, AL, 3 Nov. 1994.

Tahir Rizvi to Damon Manders, Huntsville, AL, 15 Feb. 1996.

Ned Rizzardi to Damon Manders, Huntsville, AL, 19 Jan. 1996.

Ed Scott to Damon Manders, Huntsville, AL, 26 Jan. 1996.

Jeff Seward to Damon Manders, Huntsville, AL, 8 Mar. 1996.

Jarel Starling to Damon Manders, Huntsville, AL, 25 Apr. 1996.

Rick Suever to author, Huntsville, AL, 7 Sep. 1994.

Larry Werner to Damon Manders, Huntsville, AL, 22 Jan. 1996.



# LIST OF ABBREVIATIONS AND ACRONYMS

ACOE	Army Communities of Excellence		ning
ACTS	Army Criteria Tracking System	CERCLA	Comprehensive Environmental Response Compensation and Liability Act
A-E	Architecture-Engineering		
AFCS	Army Facilities Components System	CIDP	Cryofracture/Incineration Demonstration Plant
AIEP	Army Ideas for Excellence Program	CM	Configuration Management
AMC	U.S. Army Materiel Command	COEMIS	Corps of Engineers Management Information System
AMPRS	Army Military Construction Progress Reporting System	CONTRAST	Corps of Engineers Nontraditional System Training
APAP	Army Pollution Abatement Program	CSDP	Chemical Stockpile Disposal Plan
ASRM	Advanced Solid Rocket Motors	DERA	Defense Environmental Restoration Account
BIC	Braduskill Interceptor Concept	DERP	Defense Environmental Restoration Program
BLAST	Building Load Analysis and System Thermodynamics	DFSP	Defense Fuel Supply Point
BMD	Ballistic Missile Defense	DIS	Design Information System
BRAC	Base Closure and Realignment	DLA	Defense Logistics Agency
BZ	3-Quinuclidinyl Benzilate	DNA	Defense Nuclear Agency
CACES	Computer-Aided Cost Estimating System	DOE	Department of Energy
CAMDS	Chemical Agent Munitions Disposal System	DRMS	Defense Reutilization and Marketing Service
CDUP	Criteria Document Update Program	DRMO	Defense Reutilization and Marketing Office
CEFMS	Corps of Engineers Financial Management System	DSM	Demand Side Management
CERL	Construction Engineering Research Laboratory	ECONPACK	Economic Analysis System
CEUP	Computer Evaluation of Utilities Plan-		



EDITSPEC	Automatic Computer Editing of Specs		neers
EEAP	Energy Engineering Analysis Program	HTW	Hazardous and Toxic Waste
EEO	Equal Employment Opportunity	IDS	Intrusion Detection System
EHSC	Engineering and Housing Support Center	INSCOM	U.S. Army Intelligence and Security Command
EMAAR	Engineer Management Automation Army Reserve System	JACADS	Johnston Atoll Chemical Agent Disposal System
EMCS	Energy Monitoring and Control System	KERO	Kuwait Emergency Recovery Office
EMP	Electromagnetic Pulse	KWBS	Key Worker Blast Shelter
EPA	Environmental Protection Agency	LABCOM	Laboratory Command
ERDA	Environmental Restoration Defense Account	LoAD	Low Altitude Defense System
ERDS	Environmental Restoration Defense System	LCPM	Life Cycle Project Management
ERIS	Exoatmospheric Reentry-Vehicle Interceptor Subsystem	LMI	Leadership Management Internship
ETL	Engineer Topographic Laboratory	MAGLEV	Magnetically Levitated
ETS	Effluent Treatment System	MCX	Mandatory Center of Expertise
FEMA	Federal Emergency Management Agency	MFDO	Medical Facility Design Office
FIDS	Facility Intrusion Detection System	MICOM	Missile Command
FOA	Field Operating Agency	MPBSCP	Munitions Production Base Support Construction Program
FORSCOM	Forces Command	MRI	Magnetic Resonance Imaging
FUDS	Formerly Used Defense Sites	MSFC	Marshall Space Flight Center
FUS	Formerly Used Sites	NASA	National Aeronautics and Space Administration
GBFEL-TIE	Ground Based Free Electron Laser-Technology Integrated Experiment	NMD	National Missile Defense
GFP/E	Government Furnished Property/Equipment	OCAR	Office of the Chief of the Army Reserve
HEDI	High Endoatmospheric Defense Interceptor	ODASD-E	Office of the Deputy Assistant Secretary of Defense for Environment
HFPA	Health Facilities Planning Agency	OEW	Ordnance and Explosive Waste
HMX	High Melt Explosive	OSHA	Occupational Safety and Health Agency
HQUSACE	Headquarters U.S. Army Corps of Engi-	OTSG	Office of the Surgeon General
		PAX	Programming, Administration, and Execution



PBS	Production Base Support
PBSCP	Production Base Support Construction Program
PEP	Partners for Environmental Progress
PREP	Power Reliability Enhancement Program
PROSPECT	Proponent-Sponsored Engineer Corps Training
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	Research and Development Explosive
RFI	Remedial Feasibility Investigation
RI/FS	Remedial Investigation/Feasability Study
RTLTP	Range and Training Lands Program
SBA	Small Business Administration
SDB	Small Disadvantaged Business
SDI	Strategic Defense Initiative
SDIO	Strategic Defense Initiative Office
SES	Shared Energy Savings
TCX	Technical Center of Expertise
TOCDF	Tooele Chemical Demilitarization Facility
TPC	Third Party Contracting
TRADOC	U.S. Army Training and Doctrine Command
WES	Waterways Experiment Station
UMCS	Utility Monitoring and Control System
USASSDC	U.S. Army Space and Strategic Defense Command
USATHAMA	U.S. Army Toxic and Hazardous Material Agency



